Transition to a liberalized environment

experiences and issues in regulation

Transition to a liberalized environment
experiences and issues in regulation

(Proceedings of the conference held on
3 and 4 February 1999 in New Delhi, India)

Editors
Leena Srivastava
S K Sarkar

Organized by

Tata Energy Research Institute

© Tata Energy Research Institute 1999

ISBN 81-85419-65-5

All rights reserved. No part of this publication may be reproduced in any form or by any means without prior permission of the Tata Energy Research Institute.

Published by
teri
Tata Energy Research Institute
Darbari Seth Block, Habitat Place
Lodhi Road, New Delhi - 110 003, India
Telephone +91 11 460 1550, 462 2246
Fax +91 11 462 1770, 463 2609
E-mail mailbox@teri.res.in
Web www.teriin.org

Printed by
Replika Press Pvt. Ltd
A-229, DSIDC Narela Industrial Park
Narela, Delhi - 110 040, India

Contents

xi Preface

xiii Acknowledgements

xv Foreword

INAUGURAL SESSION

3 Welcome address
R K Pachauri
6 Independent regulation and infrastructure development
Deepak Parekh
9 Keynote address Developments in competition and regulation of the British electricity industry
Stephen C Littlechild
18 Inaugural address
Jagmohan
22 Special address
Linda K Breathitt
23 Vote of thanks
Leena Srivastava

PLENARY SESSIONS

Plenary session 1 Policy and legal framework for regulation

27 Policy and legal framework for regulation
S L Rao
33 Research in a transitional regulatory environment
Raymond W Lawton
39 Framework for regulation: the Indian experience
S Sundar and S K Sarkar

Plenary session 2 Issues in tariff/pricing

54 Issues in tariff/pricing: future directions for regulation of India's infrastructure sectors
R K Pachauri
63 Tariff reform and regulation
Rakesh Mohan

POWER

69 Background paper
K Ramanathan and Gaurav Bhatiani

Session 1 Regulatory framework

99 Regulatory reform in the state electricity sector
M G Ramachandran
104 Basic issues of regulation in the Indian power sector
D K Roy
114 Evolution of energy regulation in the United States
Linda K Breathitt

Session 2 Market structure

121 Transition to a liberalized environment: regulation and market structure
R V Shahi
128 Choice of a power market model for India
K Ramanathan
137 Reform and regulation in the Indian power sector
Sarah P Voll and Michael B Rosenzweig
157 Deregulation, privatization, and promotion of competition: an Australian success story
Sohail Hasnie
183 Creating a competitive electricity industry: restructuring in Massachusetts
James Connelly

Session 3 Tariff setting

187 Tariff setting for power: the Israeli experience
Chaim Elata, David Assous, and Moshe Tsur
198 Tariff reform in India: a review of directions and issues
Sanjeev S Ahluwalia
215 Availability tariff: an overview
Bhanu Bhushan
219 Power: tariff setting
Mary Clark Webster

Session 4 Regulatory reforms: present and future strategies

224 Effectiveness of regulatory reforms: present and future strategies
Manubhai Shah
228 Regulatory reforms: expectations of rural energy and renewable energy sectors
B S K Naidu
233 Regulating technological change in the electricity sector: thinking beyond today
Ajay Mathur
238 Regulation in India: the next step
Jim Bever
240 Recent reforms in the Australian electricity supply industry
Allan Asher
250 Summary of question and answer sessions

PORTS

255 Background paper
S Sundar and S K Sarkar

Session 1 Regulatory framework

263 Regulation in the transition to liberalized economy
S Venkiteswaran

265 Australian port authority reform
Allan Asher

Session 2 Market structure

277 Transition to liberalized integrated infrastructure development
Nikhil Gandhi

281 Ports: market structure
R R Sinha

282 Indian ports: transition to a liberalized environment
Amal Chakravorty

Session 3 Tariff setting

287 Application of revenue yield price control to Victorian ports
Sohail Hasnie

305 Tariff setting: changes in port pricing
Swapan Chakrabarti

Session 4 Regulatory reforms: present and future strategies

308 Regulation in the port sector
M P Pinto

312 Regulatory reforms: present and future strategies
Nikhil Gandhi

316 Summary of question and answer sessions

TELECOM

321 Background paper
Rakesh Kapur

Session 1 Regulatory framework

330 Experiences and issues in telecom regulation
T H Chowdary

334 Regulatory frameworks for developing countries
Mahesh Uppal

337 Regulatory aspects: industry's view
T V Ramachandran

341 New Telecom Policy 1999: suggestions for formulation
S Kulkarni

343 Regulatory framework
Virat Bhatia

Session 2 Market structure

346 Competitive multi-operator environment in developing markets
M Z Doja

351 Optimizing investments without compromising competitive benefits
Ashok Barat

355 Market structure
Richard D French

362 From monopoly to competitive market regulation: the Massachusetts experience
James Connelly

Session 3 Tariff setting

365 Tariff setting: a Canadian regulatory perspective
Fred G Bigham

367 Tariff setting and cost separations: a company's point of view
Dave Lindsay

368 Tariff settings
S P Purwar

372 Tariff policy: some considerations
Harsha Vardhana Singh

Session 4 Regulatory reforms: present and future strategies

374 Impact of the new telecom policy
K Vijay Rao

380 Current scenario and recommendations for the future
Hemant Luthra

393 Microeconomic analysis of Indian market conditions
Eric Buerkler

395 The Australian Competition and Consumer Commission in the open competitive telecommunications market
Allan Asher

OIL AND GAS

411 Background paper: issues in the deregulation of the oil and gas sector
R K Narang, Ardhendu Sen, and Leena Srivastava

Session 1 Regulatory framework

427 Legal and regulatory framework for the oil and gas sector in India
Jyoti Sagar

431 Regulatory framework
R K Narang

436 Regulatory authority
M S Ramachandran

440 Need for an integrated regulatory authority for the hydrocarbons sector
J M B Baruah

443 Implementation of a regulatory framework: the Indian gas industry
R P Sharma

Session 2 Market structure

450 Oil marketing reforms: concerns
P Raghavendran

453 Market issues
R K Batra

456 Market structure after deregulation: promoting competition among public sector oil companies
S Behuria

464 Market structure
S N Jha

Session 3 Tariff setting

468 Regulatory framework for the gas industry in India
J K Jain

475 Tariff setting and pricing: oil and gas sector
Larry B Morse

479 Tariff and price setting in the oil sector
V K Chawla

Session 4 Regulatory reforms: present and future strategies

481 Regulatory reforms: implementing strategies
Subir Raha

496 Can the tortoise always win? Petroleum deregulation in India
Leena Srivastava

501 Transition to a liberalized environment: comment on implementation strategies
Joanne M Kauffman

505 Australian gas reform
Allan Asher

516 Summary of question and answer sessions

CONCLUDING SESSION

521 Presentation of session discussions: power
Gaurav Bhatiani

523 Presentation of session discussions: ports
C S Venkatraman

526 Presentation of session discussions: telecom
M Karuppasamy

528 Presentation of session discussions: oil and gas
Rahul Deep Singh

530 Panel discussion

540 Concluding remarks
R K Pachauri

543 Vote of thanks
S K Sarkar

545 Index

573 Appendix 1 Programme

579 Appendix 2 List of speakers

585 Appendix 3 List of participants

Preface

One of the most important organizational innovations currently under implementation in the structure and process of decision-making and in governance related to the major sectors of the Indian economy is the emergence of independent regulation. The genesis of independent regulatory bodies and their functioning on a professionally rational basis stems from the early experience of natural monopolies reaping windfall profits and earning unfair economic rents that reduced human welfare. A solution to the challenge of pricing and monitoring of the operations of natural monopolies was found particularly in the US through the institution of independent regulatory mechanisms, which attempted to simultaneously protect the interests of producers and consumers of the services provided by these monopolies. However, over the years, independent regulation even in the US has changed substantially, and other models and methodologies have evolved that merit attention and analysis in terms of their structure and economic effects. India is a latecomer in adopting the innovation of independent regulation, but in some sense this also provides an advantage because informed choices can be made in the Indian situation based on the experience of other countries.

TERI as a forward-looking research institution visualized the rapidly growing need for research and generation and dissemination of knowledge in the field of regulatory studies, given the rapid liberalization of the Indian economy since the early 1990s. The Institute, therefore, set up a division for regulatory studies and governance in early 1999. One of the first major activities of the Division was to organize a national conference on *Transition to a liberalized environment: experiences and issues in regulation* with a view to learning from other parts of the world and also from the experience generated thus far in India itself. This volume is the published output of the proceedings of this conference. It is gratifying that the conference, and by implication, the Indian challenge, attracted widespread attention from professionals in other countries who have an interest in spreading the knowledge and message

effective independent regulation. As a result, participation
the conference has been at an extremely high level and
verse in range and disciplines covered. These proceedings
e not merely of relevance to India, but would also be of
lue, it is hoped, in several developed countries and un-
ubtedly in other developing countries, which are also
appling with similar problems and challenges in an evolving
age of the institutional innovation of independent regula-
n. Indeed, the contents of this volume and the eminence of
e authors who have contributed to it are indicators of the
lue and relevance of the pages that follow.

R K Pachauri
Director, TERI

Acknowledgements

This volume is the proceedings of the national conference on *Transition to a liberalized environment: experiences and issues in regulation*, organized by TERI on 3 and 4 February 1999. This conference would not have been possible without the support and sponsorship of the Infrastructure Development Finance Company Limited. Our thanks are due to the Telecom Regulatory Authority of India and the Tariff Authority for Major Ports for their participation in the conference. We are also grateful to the other sponsors: the Central Electricity Regulatory Commission, Orissa Electricity Regulatory Commission, Hindustan Petroleum, Cellular Operators Association of India, Department for International Development, and HSBC Investment Banking.

We would like to gratefully acknowledge the members of the Steering Committee for their help in conceptualizing the conference and guiding it forward: Prof. S L Rao, Chairman, Central Electricity Regulatory Commission; Mr Deepak Parekh, Chairman, Infrastructure Development Finance Company Limited; Mr B K Zutshi, Vice Chairperson, Telecom Regulatory Authority of India; Mr S Sathyam, Chairman, Tariff Authority for Major Ports; Mr Pradeep Baijal, Special Secretary, Ministry of Power, Government of India; Mr Devi Dayal, Additional Secretary, Ministry of Petroleum and Natural Gas, Government of India; Mr K P Singh, Chairman, Karnataka Electricity Board; Dr R K Pachauri, Director, TERI; Mr S Sundar, Distinguished Fellow, TERI; and Mr R K Narang, Distinguished Fellow, TERI.

Special thanks are due to the rapporteurs of the conference: Mr Gaurav Bhatiani, Ms Anuja Bitta, Dr Ranjan Bose, Mr Kaushik Deb, Ms Sangeeta Gupta, Mr Shahid Hassan, Mr M Karuppasamy, Mr Satish Kumar, Ms Indrani Nagar, Ms Megha Shukla, Mr Deepak Sharma, and Mr Rahul Deep Singh, TERI; and Mr C S Venkatraman, Chief Executive Officer, Indian Ports Association.

The Publications Unit at TERI has been responsible for the production and publication of this book. We would also like to acknowledge our colleagues in the Publications Unit – Ms J Ram Mohan for editorial assistance and managing the publication of the proceedings; Ms Mudita Chauhan, Mr K P Eashwar, Ms Meena S Janardhan, and Ms Anitha Saravanan for assistance in copy-editing; Mr Yateendra Joshi for design and layout; Ms Anshu Eashwar for typesetting; Mr R K Joshi for the graphics; and Mr T Radhakrishnan for supervising the production. Ms K Radhika, Mr T P Sankar, Ms Geeta Sood, Ms K Y Valsa, and Ms Veena provided the much-needed technical assistance. Thanks are also due to the colleagues at Library and Information Centre for indexing the volume.

Special mention must be made of the editorial assistance provided by Byword Editorial Consultants and Publishers, New Delhi.

Foreword

Since the early 1980s there has been a wave of privatization and unbundling of utilities in many countries – both developed and developing – throughout the world. This has also involved the introduction of competition and the establishment of new regulatory institutions. These developments were initially led by the telecommunications industry but were soon followed by other network industries such as electricity and natural gas; now, water supply and rail are also involved.

In India, the issue of privatization and regulatory reform came to the fore in 1991 when the country was going through a difficult economic situation. Adverse economic conditions were also a factor that led Britain to modernize its utility sector. The aims were to increase the country's efficiency and ability to compete internationally, and to enable greater investment so as to improve the quality of supply.

In a relatively short period of eight years, a serious restructuring of the telecom, electricity, hydrocarbons, and ports sectors has been initiated in India. An independent regulatory authority has been established for the telecom sector, the Central Electricity Regulatory Commission has been set up, and an enabling provision has been made to establish state electricity regulatory commissions, given the concurrent nature of this sector in India. The Tariff Authority for Major Ports is also in place.

The process of regulatory reform will need to evolve over time, and there are several challenges along the way. These include the need to build the financial strength of the utility sectors in India at the same time as protecting customers. The high incidence of poverty and the widespread low income levels make it all the more important to improve the present low levels of efficiency so as to keep any price increase to a minimum. Attracting more widespread political support will be helpful. In this context, the experience of the UK and elsewhere is helpful. Prices and complaints have come down (in some cases after initial increases) and investment and reliability have improved.

The regulatory reform process and the creation of a broad-based acceptance of this process need further research and information support. The conference on 'Transition to a liberalized environment: experiences and issues in regulation', organized by TERI on 3 and 4 February 1999, provided a unique platform for both the regulators and the regulated from across sectors to get together and share their experience thus far. The invitation to experts at the international level added value to this event by bringing in the latest thinking in regulation in other countries.

This volume spans the 20 sessions of the conference, covering the myriad issues that the subject of regulation throws up. It also provides a concise sector-wise analysis of the discussions and deliberations that the presentations provoked over the two days. The wide range and scope of coverage of the book will make it a useful reference to the issues in regulation in the infrastructure sector in India.

Stephen Littlechild

Stephen C Littlechild
Former Director General of Electricity Supply
Office of Electricity Regulation, UK

Inaugural session

■

Welcome address
R K Pachauri

■

Independent regulation and infrastructure development
Deepak Parekh

■

Keynote address Developments in competition and regulation of the British electricity industry
Stephen C Littlechild

■

Inaugural address
Jagmohan

■

Special address
Linda K Breathitt

■

Vote of thanks
Leena Srivastava

TERI,
New Delhi

R K Pachauri

Welcome address

Transition to a liberalized environment: experiences and
issues in regulation 3-5

Honourable Minister for Communications, Mr Jagmohan, Mr Deepak Parekh, Mr Urjit Patel, Prof. Stephen Littlechild, Ms Linda Breathitt, members of the Steering Committee of this conference, distinguished ladies and gentlemen.

I have great pleasure in welcoming you to this conference. A special welcome to our distinguished guests who have come from overseas. Yesterday we had a few nervous moments, and some excitement because there was some disruption in Prof. Littlechild's travel arrangements, but everything worked out all right in the end.

We are indeed delighted to have with us Mr Jagmohan who, as all of you know, is a distinguished civil servant and who is now a political leader and Minister for Communications. In the telecom sector, as you are aware, there have been some major changes and there are several changes that are going to take place in the future. I had the privilege of interacting with our honoured chief guest when he was chairing the Standing Committee of Parliament dealing with energy, and it was a very stimulating exercise. Prof. Littlechild, of course, needs no introduction because what he has done in bringing about enormous gains in efficiency in Britain's power sector as the chief of the Office of Regulation is now known round the world.

Such a conference is perhaps being held for the first time in India, particularly in respect of the enormous spread of the subjects that are being covered. It is our effort to gather the experiences and the insights of both the regulators and those who have been regulated round the world.

India has embarked on a process of involving the private sector in its infrastructure development. In view of this and also the fact that independent regulation brings with it several benefits to the public at large, this is an exciting area of policy formulation and implementation. We are particularly happy that the Infrastructure Development Finance Company Limited has joined hands with us in this venture; of course, there are several other organizations that have provided us help and support. This is indeed for the first time that a conference like this is being held. Therefore, I hope the output of this conference and its proceedings would be taken note of at various levels of the government, in the private sector, and by the public.

If I may say with some sense of humility, TERI has been responsible for launching several firsts. It was over 10 years ago, for instance, when climate change was not an important issue in the policies of national governments that TERI embarked on a programme of research on climate change. We have since then established ourselves as one of the leading developing-country research institutions working in the field of climate change. Apart from doing research, we have also done a fair amount towards influencing the process at the international and the national levels as the negotiations in this area have progressed.

For those of you who are not familiar with this Institute, I might just mention that we are a not-for-profit independent institute. We work on several fronts in the fields of energy, environment, and sustainable development. As part of our work, issues of control, regulation, and governance become vitally important. For this reason, we have established within TERI a new division on regulation and governance and we hope that as the years go by we will expand our activities in this area and build on the small beginning that we have made. This is an appropriate time to look at these issues because we are on the eve of the next millennium, when India will be a very different and much better society and nation than what it has been in the past. Issues of restructuring, governance, and independent regulation are going to guide efforts towards meeting that dream.

It is also important for us to organize this function as the first major function this year since the year represents the silver jubilee of the Institute. TERI was formally established in 1974. We started on our own research activities towards the end of 1982 with just two or three persons on our staff. Today, we are about 500 strong and have a visible presence in India not only in New Delhi but in Bangalore, Guwahati, and Goa. We also have a presence overseas – an affiliate institute called the Tata Energy and Resources Institute established in Washington, DC. We have staff based in Germany, Japan, and Russia as well. We are hopeful that sooner rather than later we would also have a presence in the UK.

We are eager to see that at this conference we discuss issues as objectively as possible. I am sure there will be much that would come out from the wisdom, the experience, and the knowledge of this distinguished group which would help formulate policy and that would aid the actions of the regulatory organizations themselves. At the end, there will be a panel discussion in which the essence of what was discussed in all the technical sessions will be presented. We hope that therein we will be able to resolve some of the questions, doubts, and issues that come up for discussion.

So I will not say any more at this point of time except to repeat my warm welcome to you all. Once again, may I welcome Mr Jagmohan and thank him for sparing the time to be with us. I would like to acknowledge the presence of Ms Linda Breathitt who is a commissioner from FERC (Federal Energy Regulatory Commission) in the US. We are particularly delighted to have her here and we would certainly like to listen to her views for a few minutes during this inaugural session. As you are aware, the US is rich in experience with regulatory issues and FERC has been a major innovator and guide in the changes and the innovations that have taken place in several industries in the US. Thank you.

Infrastructure Development Finance Company Limited, Mumbai

Deepak Parekh

Independent regulation and infrastructure development

Transition to a liberalized environment: experiences and issues in regulation 6-8

Ladies and gentlemen. It gives me great pleasure to join Dr Pachauri in welcoming you to this national conference on regulation. The IDFC (Infrastructure Development Finance Company Limited) is proud to be associated with this conference. We at the IDFC strongly believe that an independent and enabling regulatory framework is a critical prerequisite for achieving our mandate of leading private capital to commercially viable infrastructure projects in India. We believe that transparent, stable, and fair regulation is good for business. Your presence reaffirms our belief that the issues to be discussed over the next couple of days are indeed relevant and important.

Regarding our efforts in reforming infrastructure sectors, we seem to have perfected the art of first tying ourselves up in knots and then spending a great deal of time undoing the damage. For example, in the power sector, we are trying to dismantle the vertically-integrated utilities on the one hand and, at the same time, binding the sector into long-term take-or-pay contracts with private power producers.

Unfortunately, our efforts to establish independent and credible regulatory institutions are also no exception to this, if our experience in the telecom sector is anything to go by. The Government of India created the Telecom Regulatory Authority of India but through its operating arm, the Department of Telecommunications, it continues to periodically challenge the regulator's decisions in the courts. We are moving towards a similar deadlock in the case of electricity regulatory commissions. For instance, the primary task of these commissions is to increase tariffs to economic levels and ensure that any subsidy is made good from the general exchequer of the state governments. As most state governments are unwilling to divest ownership of the sector, these regulators could end up in tussles with the very governments that have created them.

The principal reason for this is that we have neither completely understood the concept of regulation nor its rightful place in the context of restructuring infrastructure services. As you are aware, the need for economic regulation typically arises from market imperfections such as monopoly, information asymmetry, and externalities. Accordingly, the design of a regulatory framework for an industry should be attuned to the specific market imperfections that need redressal.

In the case of infrastructure services, the principal reason for establishing independent regulators is the need to vitiate the monopolistic character of the industry. Fulfilling this need, in operative terms, translates into a multiplicity of responsibilities. On a continuous basis, the regulator should focus on obtaining a better deal for consumers by introducing competition, thereby reducing the monopoly power of the dominant incumbent operators. At the same time, the regulator should retain incentives for the regulated entities so that they continue to invest and operate efficiently. For the efficient evolution of the sector, the regulator should ex ante create an enabling environment for the entry of new and efficient technologies, despite the risk that it might displease existing operators.

As regards the goal of tackling or reducing monopoly power, the task of extracting relevant information from regulated entities will only be that much more arduous if the regulator is pitted against a dominant monopoly. If alternative ways of mitigating monopoly power can be found, the need for regulation can be considerably reduced. The experience in other countries clearly shows that there are at least two ways to achieve this.

First, thanks to certain technological developments, the erstwhile vertically-integrated monopolies can now be unbundled into their constituent and distinct elements, some of which are amenable to the introduction of competition. For example, it is now well established that the electricity industry can be unbundled into separate generation, transmission, and distribution segments and that it is feasible to introduce competition in generation. If the power sector is unbundled accordingly, the regulatory burden can be drastically reduced since the market forces can be expected to take care of the task of regulating the generation component of the sector. Similarly, if the responsibility of distribution in different areas is given to different firms, the regulator can expect to have that much more information, which makes it easier to regulate them by comparing the performance of one against the other.

Second, the regulator can fight his battle by placing the gun on the shoulder of major consumers. Unlike individual or domestic consumers, large institutional consumers are likely to be more effective in eliciting the best deals from large suppliers. Hence, if such major players are allowed to negotiate their supplies directly in a transparent manner, the regulator can use the corresponding price signals for the remaining consumers.

As regards the task of retaining incentives for regulated firms, the least that a regulator can do is reduce regulatory uncertainty. This can be achieved by establishing transparent principles of regulation for a given period and then adhering to it. The task of structuring incentives is a sophisticated subject in itself, in that it draws upon a multiplicity of faculties ranging from economics and engineering to politics. Hence, we need to equip our regulatory institutions with the right skills.

The best regulation is perhaps the one that regulates the least. Good regulation is much more than merely grafting one more institution on to an existing industry structure. In fact, for regulation to be effective, it needs to be independent, transparent, and, if need be, accompanied by appropriate restructuring of the industry.

Although complex in its own right, thankfully, regulation is not a rocket science. Others have harnessed it to keep their infrastructure sectors on an even keel during the period of transition and beyond. We can do it too, provided we are willing to think through the issues and learn from others. I sincerely hope that this conference will elevate the policy debate on regulation in the context of infrastructure development in our country.

Former Director General of Electricity Supply, UK

Stephen C Littlechild

KEYNOTE ADDRESS Developments in competition and regulation of the British electricity industry

Transition to a liberalized environment: experiences and issues in regulation 9–17

Chairman, Honourable Minister, ladies and gentlemen. I am very honoured to be invited to deliver the keynote address at this conference on what I think is one of the most exciting topics at one of the most exciting times in the development of India's regulation policy. I was wondering how relevant the British experience would be, but I was reassured when I read an article in the latest edition of *Business India*, which devoted its lead editorial to spelling out some of the problems in the electricity sector in India today and some of the solutions that the editor recommended. In brief, the concerns that it expressed were heavy financial losses, uneconomic tariffs, poor quality of supply, rising demand, and a significant need for new investment. Welcoming the government's policy in this area, the editorial argued for restructuring the state electricity boards, rationalizing tariffs, introducing private ownership, and establishing and developing regulatory commissions; and I am sure they meant to include encouraging competition. These are very familiar and very welcome topics to me, and indeed these are policies that are increasingly being adopted all over the world. Perhaps the first example was in Chile. Subsequently policies of this kind have been introduced in Norway, Sweden, Finland, Australia, New Zealand, Spain, Italy, Argentina, Columbia, many parts of Latin America, Europe, Asia, and many states in the US and Canada. Within India, a number of states, particularly Orissa, have adopted these policies.

Motivation for British electricity privatization

The experience that we have in Britain ought to be of help to you and I hope that it will be useful if I review rather briefly the experience we have had over the last 10 years or so. Let me start with the motivations for privatization in Britain. There was a philosophical preference to reduce the role of the government in industry, but the more practical aim was to increase the role of the customer. The government stated that decisions about electricity supply should be driven by the needs of the customer. It also wanted to increase efficiency, which had not been particularly distinguished in nationalized industries. The process of privatization was increasingly popular with investors and the government's role was to increase the proportion of industry which was owned by small investors. Privatization proceeds were a valuable source of revenue for the government, which could be used to meet its expenditure or to reduce taxation. Finally, after the development of regulation for British Telecom, it was apparent that it was possible to regulate a monopoly efficiently and consider such a policy for other utilities including electricity.

Principles

What were the principles that were followed in privatizing electricity? The first guiding principle was that the decision should be driven by the needs of customers. The second was the decision to restructure the industry so as to separate (as far as possible and practicable) the monopoly elements and the competitive activities. The third was the decision to introduce competition and choice for customers wherever possible; where it was not, there would be regulatory control of the monopoly elements – prices and quality. However, these regulations would be put in with the aim of increasing the incentives for efficiency on the part of the monopoly. A regulatory body would be established with well-defined powers. Clearly, regulation was needed to protect customers and to promote competition, but it was important from the point of view of investors that these powers should not go beyond a reasonable level. Finally, the government needed to have a role to reflect the elements of public interest that might not be encompassed in the other elements of regulation. Once again, this role needed to be closely defined, particularly if it was intended to attract private capital.

Restructuring of the British electricity industry

The main restructuring that took place in England and Wales was that the large central electricity generating board, which had been responsible for almost all the generation and transmission, was split up and transmission was created as a separate activity. In the National Grid Company, which was also responsible for organizing the pools, generation was separated from transmission. This proved to be extremely important for encouraging competition because it meant that new generators could contract to use the transmission system and often have the system extended for their benefit, knowing that it was not being operated to protect existing incumbent generators. The transmission company has a statutory duty to promote competition. Generation was split into three companies. The reasons for this are associated with the desire to privatize the nuclear company which was at that time thought to be possible, but shortly thereafter recognized as not initially possible. The consequence is that only three companies were created. In retrospect, that was not enough and more companies could and should have been created.

The electricity pool was created whereby all generators would bid into the pool to run and all suppliers would purchase out of the pool. This served the purpose of establishing the means of deciding which generators would run, and what the prices would be at each time of the day. We now believe however that we can improve on the pool and create a more flexible, sophisticated, and advanced set of markets similar to those we see for other commodities rather than regarding electricity as something very special. At the moment, we have under way a programme of reform which will take a couple of years.

It was decided that distribution should not be separated from supply. The distribution and supply companies had already been separated from generation. At that time, it was not clear that supply could be a completely separate activity from distribution. It was also not clear that the concept of competition in supply would become operational and realistic. We now realize that supply is a separate and distinct activity from distribution. Dealing with customers is a different activity from operating the wires on a system, and increasingly we are looking to separate those functions.

What I have to talk about mainly relates to England and Wales; in Scotland, the two companies are completely vertically-integrated bodies that are increasingly being regarded as presenting problems, and something may have to be done about that.

Competition in generation

1990 to now

Let me now look at the development of competition. Initially, the two largest companies were responsible for nearly 80% of the output in England and Wales. They were often regarded as a duopoly, and that was a matter of concern. Since then, competition has been evolving in a number of different ways. The interconnectors with Scotland and France, which were previously only used when the central electricity generating board chose to use them, are now used fully because the Scots and French can compete without restrictions and are doing so. Indeed, the Scots have increased the capacity of the interconnector to compete more effectively.

The nuclear stations, which were previously largely unknown because their performance was buried in the performance of the generation companies, were now isolated. Their performance was poor by international standards.

However, it has improved remarkably. The availability of nuclear stations has increased by over a half in the last seven or eight years as a result of more efficient maintenance. Consequently, their output is much greater than it was before and they too are challenging the larger players.

I was not satisfied that competition was developing fast enough and I asked the two largest generators to dispose of some of their stations to competitors. In the event, both sold plants to one of the regional companies, Eastern. This created another player in the game and, because Eastern ran these stations much more intensively and more aggressively than the previous companies had done, Eastern now has about 10% of the market.

Finally, but by no means least important, the new entrants who came in and were willing to build stations from scratch now account for about 15% of the market and more are still wishing to enter.

The consequence of these developments is that the share of the duopoly has been almost halved since privatization. However, that does not mean that the problem has been solved.

The future

There is still evidence that the largest companies can influence the price – they have a pool price higher than that at the new entry level and have increased it. We know that there will be further entry if allowed, but it will take time. We need to consider what to do until then. An additional complication is that the new government recently decided to operate a stricter consents policy in order to protect the coal industry for a little longer. In practice, this means that it will refuse permission to almost all the potential new entrants powered by gas. In these circumstances, further divestment of plants by the main companies is needed to assist in this transition to competition. I would emphasize that this cannot be an alternative to new entry; new entry is crucial for driving down prices and preventing existing players from keeping up prices.

Competition in supply

There was initially great uncertainty about the whole concept of competition in supply as it was completely unknown at the time of privatization. I had to argue strongly to get any reference to it in the government's initial White Paper. People said that customers would not bother to choose a supplier and that suppliers would not be interested in competing. That is one reason why supply was initially not separated from distribution.

The government also decided to phase in the introduction of competition in supply by creating a franchise which allowed the generating companies and in turn the incumbent suppliers to sign higher-priced contracts with the coal industry to give that industry further protection during its own transition to competition. This would come at the expense of smaller customers.

In fact, customers have greatly welcomed the ability to choose their supplier and competitive suppliers have increasingly grown used to this concept of competition and participated enthusiastically.

Business customers

For all sizes of the market there has been a steady growth in the proportion of customer demand met by second-tier suppliers (i.e., those from outside the local area). Initially about 40%, but now 80% of the demands of large customers are met by suppliers other than the local ones; for medium-sized customers, this proportion has gone up from about 25% to 60%. Figure 1 shows the steady increase in the proportions in these two markets. Some of the second-tier suppliers are the major generators, others are local companies increasingly supplying outside their areas on a national basis.

Domestic customers

The process of introducing competition in supply for domestic customers is a very considerable exercise. Many people doubted whether it would be worthwhile, as there were 26 million customers to accommodate. We had to introduce profiles of usage to minimize the costs of metering so that domestic customers did not have to install expensive new

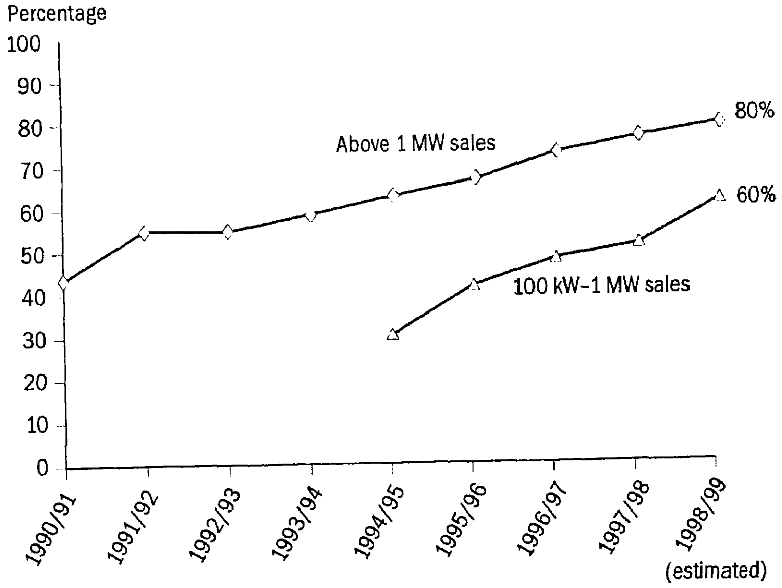


Figure 1 Market share of second-tier suppliers

meters. We had to ensure that all the companies had registration and data transfer systems to keep a record of where customers were and where they would be moving to make sure that they could be billed accurately and in a timely way. These costs were very significant, amounting to hundreds of millions of pounds. It worked out to about one per cent of each domestic customer's bill. This was also a major project management exercise. As the regulatory body, we had to be involved in organizing this because it transpired that it could not be left to the industry itself. This was a novel responsibility for the regulator. We decided to phase in the introduction of competition over about nine months, starting in September 1998 and going on to June 1999.

Customer safeguards

We are also aware that amongst domestic customers some would be better able to understand these developments and look after themselves than others. Hence, we introduced codes of practices on all the suppliers concerning their services for the elderly and disabled. We required all suppliers to provide a range of payment options such that some would suit the needs of all customers. They were required to spell out exactly what procedures they would adopt for customers who got into debt. The local companies had to make available their prepayment meter systems so that all suppliers could use this. For about a quarter of the customers, prepayment systems were absolutely crucial in enabling them to continue to pay their bills and order their usage in a way they could afford. We introduced maximum price restraints for an initial period of two years in the expectation that competition would develop, but we did not know exactly how far and how fast it would develop. We needed some guarantee that customers would be better off and not worse off. These initial price restraints provided that every domestic customer should have a reduction on average of six per cent in real terms in 1998 and a further reduction of three per cent in real terms the next year. Finally, we introduced some conditions of non-discrimination on the suppliers as a transition to a more competitive market and to make sure that the local suppliers did not discriminate to keep out new suppliers.

Results to date

The record, so far, is that all the companies have opened at least part of their areas to competition. Over eight million domestic customers now have access to competition. Over 200 000 of those customers have already changed their suppliers. Well over a million of them have signed contracts to change their suppliers when it becomes possible to do so. [At the time of publication, all areas were open to competition so that all customers can choose their supplier; about 2.5 million (10%) have already changed their suppliers.] They have been offered price reductions by competitors which vary from one area to another, depending also on the type of tariff that they prefer, but offers of around or over 10% are available.

The main reductions are on the standard quarterly credit payment type of tariffs and the least reductions are for prepayment meters and night-time economy rates which had been held down in the past or perhaps were kept just below cost. Suppliers have made the best offers to those customers that have the higher prices at the moment in relation to costs. Thus customers are now better protected by competition and are increasingly welcoming it. They are treating it quite naturally because they have seen competition developing in gas supply and many of them are now choosing to buy gas and electricity from the same supplier. All the electricity companies are now selling gas and gas companies are now selling electricity. There is a greater degree of competition across the fuels as well.

'rice controls

In the areas that are not open to competition, we have introduced price controls – on the wires in the transmission and distribution networks. Initially, the price controls set up by government flotation were not very challenging. In the case of distribution, they provided for increases rather than decreases in prices in real terms. But the companies achieved significant cost reductions and there was scope to reduce costs further. Since the assets were sold to investors at below the cost of installing those assets, it is not necessary to remunerate the assets to a higher level than what was paid for. These various factors enabled me to cut the charges of distribution and to tighten the price controls. In 1995 and 1996, we were able to cut the prices by between 20% and 30% depending on the company. After that, there was a further price reduction of three per cent a year in real terms relative to the retail price index. This set of price controls was equivalent to reducing distribution charges by nearly 10% a year for five years in a row. The benefits to customers were worth about 4 billion pounds over five years. We made similar reductions in transmission charges. In 1997, an initial 23% cut followed by reductions of 4% a year for a further four years was worth another billion pounds to users of that network.

What has been the net effect of competition and price controls on final prices to customers? By the middle of 1998 we had reductions in prices ranging from 23% to 32% in real terms since privatization, for all groups of customers. The smallest reduction was for the extra large and domestic customers. Extra large customers did not have great reductions because they had very low prices before privatization. For domestic customers, competition had not yet come in. But even these have had reductions of 23% in real terms. The largest reductions were in fact for the medium-sized industry or customers. These reflected, to a significant extent, the relative prices before privatization. Competition is now protecting those customers who did not have political bargaining power before. We expect further reductions for domestic customers, as competition is now being introduced.

Quality of service

We have been very keen to protect the quality of service. We do not want to lower prices and lower the quality of service. So we have been monitoring the technical standards so that these are maintained at a very good quality of supply. We have made investment allowances in the price control to the main and improved the network, particularly focusing on those customers that are worst served. I specified 18 standards of performance with respect to management that the companies needed to meet. The companies have met them, and we have tightened and extended the standards. The quality of service shows improvement all round. We specified minimum compensation payments in case the companies failed to meet these standards. The minimum was £20; we pay more in some respects, for example, if customers are without supply for more than 24 hours, a payment of £50 is made. Performance has improved and domestic disconnections have been reduced. Companies have used prepayment meters, they have scheduled the repayment of debts to meet the needs of customers, and disconnections for non-payment are now less than one per cent of what they were before privatization. Customers themselves are more satisfied, complaints are lower by 60%, down to less than 40% of what they were.

Present challenges

These are achievements, but there are challenges as well. Market power in generation still exists; we need to take further steps and encourage more new ventures to deal with that. We need to open the domestic market to competition and to do it without disruption to customers. Reform of the pool and the trading arrangements is under way to bring them in touch with the trading that will take place in the 21st century. We need to separate distribution and supply more effectively to facilitate competition. All these issues are more serious in

Scotland than they are in England and Wales. We need to revise the price controls and that process is under way at the moment. Some of the monopoly areas can now be opened to competition, for example, the provision of metering, meter reading, and the provision of connections to the system.

Conclusion

There have been substantial achievements in Britain on the part of the electricity industry over the last 8 to 10 years. This reflects the introduction and extension of competition both in generation and supply, and tighter price controls. There are now lower prices for customers, improved quality of service, and greater customer satisfaction. But there are still challenges, including securing more effective competition, improving the trading arrangements, separating supply and distribution further, and revising price controls. I believe all involved, including the customers, employees, and investors, have benefited from the process, but there is much still to be done.

I do not have the knowledge to analyse the situation in India in any detail. I would say that if the description given in the *Business India* article is correct, it would seem that the problems, challenges, and tasks to be done in India are probably greater than in Britain. But by the same token, the benefits from reform should be greater as well.

Minister for
Communications,
Government of
India,
New Delhi

Jagmohan

Inaugural address

Dr Pachauri, Prof. Littlechild, and other dignitaries on the dais, and participants. It is my privilege to be with you this morning for the inauguration of this important conference. I have no doubt that with such high-level participation, the deliberations of this conference would be fruitful and rewarding.

At the very outset, let me assure you that whatever recommendations you may make, whatever thinking emerges out of this seminar will receive the earnest consideration of the government. India is a very complex society with a wide variety of people and economic and social levels in which democratic institutions have yet to strike root. We are now going to add another institution, the institution of regulatory authority, in our legal and constitutional systems.

In my view, every institution has two basic components – one is its structure, the other is its soul. The structure is the administrative, legal, and constitutional framework; the soul is the social and cultural environment, the social and cultural roots of the institution. If any institution has to be effective, and must yield the results for which it was set up, then the environment around these institutions must be conducive and congenial for it to function effectively. We have, therefore, to devote our attention to this aspect as well.

We have the institution of executive authorities, the Parliament and the judiciary. I will not go into detail about this, but in India most institutions have not received the popularity which we thought they would. The judiciary on the whole has been accepted and people have a great deal of faith in the Indian judiciary. This is because the Indian judiciary was able to adapt its interpretation to the need and the changes of the time. It has interpreted the Indian constitution dynamically and creatively, and the various social and economic components of our society have accepted that attitude of our courts. That is why the poor and the rich have equal faith in our judicial system.

The new institution of regulatory mechanism will be accepted if it is able to function in a dynamic and creative manner. We have very knowledgeable, experienced, and brilliant people who will be constituting these authorities, but much will depend on how they proceed and what balance they strike. I am dealing with the telecommunications department, and a mention was made earlier about the unhappy experience of the regulatory authority in this sector. I was not the minister then, but I have seen the paper. Regarding the rates for different people, there is a viewpoint held by TRAI (Telecom Regulatory Authority of India), and there is an equally sincere viewpoint held by the standing committee of the Indian Parliament. There is also a viewpoint held by the DoT (Department of Telecommunications). According to me, all these views are honestly held. They are not biased, but the complexity of the situations with which these institutions are faced with leads to differing viewpoints. To strike the right balance is the real challenge before the regulatory authorities in India. After all, we are a poor country. What is the perception of 80% of the people when we arbitrarily decrease tariffs in some places and increase it in others? How will it be accepted by our Parliament? We are all parliamentarians and we are answerable to those needs. The issue before us is to strike the right balance. I think that some sort of formula would emerge from this seminar which will act as a guidance to the authorities and to all the various components of the government that are concerned with this reform.

Responding to another remark made earlier this morning, I would like to say that if there is a difference of perception, ultimately the interpretation of the court has to be accepted. There has been a difference of opinion between the DoT and TRAI regarding the interpretation of the legislation and the matter went to court. Ultimately, the court has to interpret and lay down the law; it has laid down a law in a particular way. Our judiciary is still supreme and we all have to accept what ultimately is interpreted by the court, unless we decide to amend the law.

Prof. Littlechild talked about the distribution, supply, and generation of electricity being separated. But in India, the most difficult point is to decide where the charges are to be collected from because there are many people who are not in a position to pay. But they too would like to have power. Cross-subsidizing becomes uneconomical for some people. Though our situation is highly complex, that is going to be the major challenge before us in this process. We are talking of a liberalized environment. There is a larger issue which we must understand – the entire society has to be liberalized, it has to develop a liberal outlook.

The attitude of a common man in England is not the same as that of someone in India. He is much more educated and mature, but a vast section of our people have a different frame of mind. How do we convince them that what has been done is in the interest of the Indian nation? It is difficult to convince them when it comes to their own interest, but we must be accommodative.

It is very difficult for a developing country to have a successful liberalized environment. This is because it also functions in a larger environment of international mechanisms, where the resource distribution between the poor and the rich is so designed that the poor will always be left with very little resources. The overall liberalized environment at the international level is making one part of the country and the world far richer than the other part. Unless we correct the distortion of history, we will not be successful. Despite all our efforts, the reform procedure will succeed only if we are able to get rid of our entrenched reflexes and old views about moving in a particular direction. At the international level, there have been so many commissions – the Brandt Commission, the Brundtland Commission – but what is the outcome of these? No one is prepared to liberalize his mind and have a fair and equitable distribution at the world level.

If our regulatory mechanism has to succeed, there is need for a very strong regulatory authority which is transparent and is a fair and just mechanism which inspires confidence. We have to impart efficiency to these institutions but we also have to ensure that the proper social, political, and cultural environment is created. Such an environment can be created only if there is also a fair and equitable distribution at the international level.

I have seen the working of the power sector. Everybody wants to enter generation and transmission, but when it comes to actual distribution and ground-level reality nobody wants to burden themselves. We have to see why we are not able to meet the challenge where it is most needed, i.e., at the ground and field level. We have to work at how to ensure acceptance and workability at the field level.

Finally, we are very grateful to Dr Pachauri for setting up a new division in his organization. When I was running through the different viewpoints held by the DoT, TRAI, and the Standing Committee, one common point that emerged was the lack of scientific data on which we have to work. Most of us are working on assumptions which may not be valid. I am sure TERI would be able to supply the scientific data to all the agencies involved and this will make their deliberations more accurate and their conclusions more correct and acceptable because when seen against certain data, acceptability increases. I am grateful to him for having taken the initiative in this matter. I wish all of you the best of luck, and best of deliberations. And, once again, I assure you that whatever thinking emerges out of the conference will receive our most earnest consideration. Thank you very much.

Federal Energy Regulatory Commission, Washington, DC, USA

Linda K Breathitt

Special address

Transition to a liberalized environment: experiences and issues in regulation 22

The study and understanding of international energy regulatory issues is very important, especially at this time of converging global energy markets and multinational business transactions. For the first time in the US, foreign companies which are very keen on purchasing assets have entered the electricity markets or have tried to sell in the power generation market in America. This is illustrative of the robust competitive market that is developing in the US. This conference on the transition to a liberalized environment is very timely. As India proceeds with the introduction of independent regulation of its energy industries, the sharing of information between nations is particularly meaningful.

I appreciate the opportunity to participate in this conference and to share views on the evolution of energy regulation in the US as we are moving forward rapidly to competitive markets and replacing monopoly regulation with market regulation. I would like to repeat some themes that I have heard this morning to illustrate how important they are as we write new rules at the Federal Energy Regulatory Commission to guide our industries and continue regulation, but in a different form. Dr Pachauri talked about consumer benefits, and the fact that consumer benefits must always be in focus when new rules are written. Transparency is also very important. An environmental analysis must also be a component of new rules going forward. As competitive energy markets develop, market monitoring, independence, and governance are very important principles and themes. I will talk more about this later when we discuss the power sector.

It is wonderful to be here with distinguished colleagues from all over the world and in India and I look forward to the opportunity to addressing you later. Thank you.

TERI,
New Delhi

Leena Srivastava

Vote of thanks

Transition to a liberalized environment: experiences and issues in regulation 23–24

It is indeed my pleasure to deliver the Vote of thanks for this particular session in the first national conference on issues and experiences in regulation. Firstly, I would like to thank Mr Jagmohan, Honourable Minister for Communications, for taking the time out to be with us on this occasion and for his very positive words of encouragement on the conference and the new division that has been established at TERI. He has very importantly pointed out the importance of the institution and of the relationship between various institutions.

I would also like to thank Prof. Stephen Littlechild for being here with us, giving us a very insightful address this morning, and sharing his experiences in deregulation. From India's learning point of view, Prof. Littlechild's remarks on the fact that reforms themselves are a dynamic process and that competition can be created actively in the areas where we are restructuring are of significance.

I would like to thank Ms Linda Breathitt for agreeing to share her views with us in this inaugural session and talking in particular about the differences between monopoly regulation and market regulation. The reason why we named this particular conference 'Transition to a liberalized environment' is because we recognize that it will take time for us to develop our own markets and be ready for a more open market structure.

I would also like to thank Mr Deepak Parekh, Mr Urjit Patel, and the Infrastructure Development Finance Company Limited for all the support they have provided. They were the first ones to come forward and join hands with us on this conference and we are indeed grateful for this support.

I would also like to thank all the members of the Steering Committee of this conference who have so ably guided us in designing this conference and its structure. They helped us get the right speakers and have supported us all through the conference.

I would like to acknowledge all those who have supported this conference, the Central Electricity Regulatory Commission, the Cellular Operators Association of India, Hindustan

Petroleum, the HSBC Investment Banking, the Orissa Electricity Regulatory Commission, the Department for International Development, the Telecom Regulatory Authority of India, the Tariff Authority for Major Ports, and the Ministry of Petroleum and Natural Gas.

I would also like to thank all the international participants who have joined us to share their experiences with us during the course of this conference and everybody else who is with us. Thank you all very much.

Plenary sessions

Plenary session 1 Policy and legal framework for regulation

Plenary session 2 Issues in tariff/pricing

■

Policy and legal framework for regulation
S L Rao

■

Research in a transitional regulatory environment
Raymond W Lawton

■

Framework for regulation: the Indian experience
S Sundar and S K Sarkar

■

Issues in tariff/pricing: future directions for regulation of India's infrastructure sectors
R K Pachauri

■

Tariff reform and regulation
Rakesh Mohan

Central Electricity Regulatory Commission, New Delhi

S L Rao

Policy and legal framework for regulation

Transition to a liberalized environment: experiences and issues in regulation 27-32

Introduction

India has been among the most regulated economies in the world. Industrial licensing, import licensing, export assistance, size restrictions by the MRTP (Monopolies and Restrictive Trade Practices) Act, storage restrictions under the Essential Commodities Act, restrictions on interstate movement of food products and some cash crops, interstate permits for vehicle movement – the list of regulations and restrictions is endless. At the operating level, FICCI (Federation of Indian Chambers of Commerce and Industry) and the CII (Confederation of Indian Industry) have reported that factories have well over 30 inspectors visiting them every month. There are numerous regulations that can be thrown at the individual citizen (particularly the trader and the manufacturer), the violation of which is subject to interpretation and punishment.

Our regulatory systems have evolved as a part of the government. As the economy expanded into more sectors and became more broad based, their extent and scope have also expanded. The command economy model that was accepted with the Second Five-Year Plan, followed by the nationalization of banks and insurance, signals emanating from the taking over of management of textile mills in Mumbai and Ahmedabad that maintaining employment took precedence over productivity and profit, etc., were some of the many influences that led to huge amounts of authority passing into the hands of officers of the government (with considerable room for discretion), whose decisions could mean substantial profits or losses. This led to a stifling of initiative, efficiency, productivity improvement, and growth. It also led to a growing ethos of corruption.

There have been regulators appointed outside of the normal government administrative systems in the past. The RBI (Reserve Bank of India) is one of them, SEBI (Securities and Exchange Board of India) was another. Many years ago, the FMC (Forward Markets Commission) was an independent regulator of forward markets. The Tariff Commission was an independent regulatory body which recommended tariff levels. The Company Law Board, the BIFR (Bureau of Industrial Finance and Restructuring) for sick companies, the Human Rights Commission, etc., were others. Some of these were, however, abolished during the 1960s and 1970s.

Neither the RBI nor SEBI can be called an independent regulator. Unlike in Germany, the US, and now the UK, the RBI ultimately reports to the finance ministry and therefore takes overall directions from the government. The appeal against SEBI is to the Finance Secretary and not to the courts. SEBI is also not an independent regulator. Other such bodies like the Company Law Board are, in fact, part of the government mechanism. The BIFR has powers but is like a government body in its lack of speed. Some others like the human rights, minorities, and disinvestment commissions are without powers. Their work raises the conscience but often does not make a difference.

In the last three years, infrastructure has been recognized as a major constraint on economic development and growth, requiring vast investments. The government does not have such funds for investment. The country needs all possible sources of funds. The entry of private investment – both domestic and foreign – is essential in addition to public investment. These investors who would be required to bring in large funds need the comfort of a regulatory environment which is independent, transparent, consistent, and predictable. This environment was not available within the constraints of government departments. Independent regulatory mechanisms were mooted as the solution. Such mechanisms have now been created for telecom and electricity. Oil and gas, roads, and ports will soon follow. Such a body for major ports is also in place.

Characteristics of an independent regulatory body

Independence lies both in relation to the individual and the institution. In the case of the individual, it would rest in an objective, open, and fair selection process; in the terms of appointment being similarly done so as to ensure that the best people are appointed; in ensuring that the terms of office are specified; and that the members of the regulatory body cannot be removed without an overwhelming cause.

At the institutional level, independence can be ensured by financial independence. The funding of the body must be independent of government or legislative vote. The regulatory body should be able to prepare its budget, authorize its expenses, decide on the type of staff it needs and recruit them, and use consultants as required.

If these characteristics are taken into account, independence for regulatory bodies is an evolving idea. It has yet to take root. Each new legislation appears to bring in more restraints as seen from TRAI (Telecom Regulatory Authority of India), the CERC (Central Electricity Regulatory Commission), and the IRA (Insurance Regulatory Authority). To ensure independence, what is required is strong media and public opinion which must demand that these regulatory bodies are independent of the government and ensure that they remain so.

Transparency Transparency is the major difference between the closed-door regulatory systems of the government and the open-door ones of independent regulatory agencies. Transparency requires that a regulatory body has no secrets. Its working must be open. It must be fully approachable by any interested party. These interested parties would include representatives of consumer interests, environment, other non-governmental organizations, experts, academics, and others. In the old system, the consultative process was selective. In the new regulatory system, consultation is available to anybody who wishes to be heard. Obviously it must be within a framework of system, discipline, and speed, but it must be made possible.

Transparency also demands access to relevant documents to those who wish to be heard. Since these regulatory areas in infrastructure are new, there are practically no expert bodies that have specialized in learning the intricacies of these areas. Some public groups are better equipped than others. The chambers of commerce representing business and industry are also consumers or suppliers. They have the wherewithal to build the expertise without too much difficulty or delay. It is the ordinary consumer, the farmer, the small-scale and village industry, and others of this nature that will need help. At the same time, it is important that such groups take help only from such sources which will not affect their judgement on the issues. It appears that it is the business of the government to support these bodies. In the US, such bodies are also supported by the industry through consultancy, research, and other such income-earning projects.

Consistency Consistency means adhering to the same principles every time. This is ensured by publicizing the framework within which the regulatory body will work. This framework must be available to everybody and should be finalized only after widespread consultation. This framework of regulation provides everybody with the knowledge of how such a body will function. There is a level playing field for the small as well as the large consumer and investor.

Predictability The requirement of predictability can be ensured when the regulatory bodies have the status of a court. Appeals against its decisions will go to a higher court and the prospect of being overturned will make the regulatory body ensure that its decisions follow a given pattern, and do not become personalized, inconsistent, and unpredictable.

Tasks ahead

Regulatory bodies have huge tasks in front of them. They are regulating vast and highly complex networks with huge investments and many vested interests, sometimes opposed to each other. They have to understand these complexities, reconcile them, and weave a path to new investment, efficiency, and growth, while protecting the consumer. They have to ensure that monopoly or quasi-monopoly positions are not exploited at the expense of the consumer or society. At the same time, in order to achieve economic development, they must ensure that sufficient surplus is generated from these infrastructure services for further investment in maintaining and expanding the network. The principal issue therefore for these regulatory bodies will relate to the setting of tariffs at which the services are provided. The tariff has to provide for the construction and maintenance of the basic network, and at the same time provide for the expenses of running that network and generating a surplus for dividends and reinvestment. The network is a monopoly; therefore access to it must be made open as far as is possible. However, there are limitations to giving total freedom of access. These must be identified so that there is discipline in the use of the network. The setting of the tariff itself has to relate not merely to the availability of the service but also to its quality and to the timely payment of the bills. Many of these factors have not in the past played much of a role in setting tariffs for these services. At the same time, the setting of tariffs must provide incentives for improvement in efficiencies, at least some of which should be passed on to the consumer. The regulatory body has therefore to understand how and to what extent efficiencies can be improved.

Regulatory bodies are usually mandated to strive for the introduction of competition. In this connection, they have to think about what competition means in the context of that particular infrastructure service and what developments in technology, organization structure, system, etc., are required if competition has to be introduced and promoted.

The regulatory bodies also have to consider the impact of the infrastructure service that they are regulating on the environment and how adverse impacts can be avoided. This is a highly emotive issue with violently opposed views. The regulatory body has to walk through this minefield to reconcile growth with sustainability.

While doing all this, the regulatory body has other considerations it must keep in mind. It does not make the policy. It only carries out its functions under the law. The policy is made by the elected government and the regulatory body has to work within the constraints of these public policies. But we must remember at the same time that bureaucracies are usually reluctant to hand over power. The Acts setting up these regulatory bodies have tended to include clauses enabling the government to issue written policy directions which will override anything that the regulatory body might decide on its own. These clauses have been made stronger with each Act. For example, Clause (10) of the IRA Bill states

> *The central government may, by notification or by reasons specified therein supercede the authority, for a period not exceeding six months, in certain circumstances and during the period of supersession appoint a person to act as the Controller of Insurance Act, 1938.*

Clause (18) says

> *The Authority shall be bound by the directions of the central government on questions of policy and that the decisions of the central government, whether a question is one of policy or not, shall be final.*

The mechanism of independent regulation has had beneficial effects in many countries in many areas. It has introduced competition and given the choice to the consumer. In many cases it has been able to improve the quality of service to the consumer and made for the freer availability of the service.

The fear in India will always be that new regulatory bodies might become yet another set of hurdles that have to be crossed by the industry, investors, consumers, and others. Public opinion can ensure that this does not happen and that the regulatory bodies serve the public interest.

Successful regulation must result in much greater participation of all the stakeholders in the decision-making process. The regulatory commissions will have to sequence their objectives. Some, like promoting investment, will be of greater importance in the earlier years, along with improving efficiency and economy. Others, like promoting the consumer interest and protecting the environment, may assume greater importance in subsequent years. Legislation will never be perfect. But since regulatory commissions have quasi-judicial status, they can creatively interpret the law to deal with many of the lacunae. At the same time, regulatory commissions must not be self-perpetuating. By their very actions they must begin to reduce the need for regulation. Their structuring should try to limit long-term commitments on staff, etc. The present focus of Indian regulatory commissions is on the setting of tariffs. In due course, they must also be given responsibility for licensing. They will have a role to play in setting accounting rules so that data are available for setting standards for quality and efficiency. The country needs to develop a philosophy regarding regulatory commissions so that all of them have some basic characteristics, especially to ensure the independence and transparency of such commissions. Regulatory economics is a subject that needs to be developed in relation to the various areas which are to be regulated. Academic involvement in the disciplines of accounting and finance, economics, and management is essential.

Public opinion, public interest groups, and the media have to be vigilant to ensure the independence of these regulatory bodies, while ensuring that they do not ride roughshod over public and consumer interests.

The National Regulatory Research Institute, Ohio State University, USA

Raymond W Lawton

Research in a transitional regulatory environment

Transition to a liberalized environment: experiences and issues in regulation 33-38

Introduction

Launching a new regulatory regime and developing a research institute to support it raise a number of issues. One set focuses on a cluster of things needed in order to have a research institute available to assist in the seismic regulatory transformations that are already under way. A second cluster examines how a country with powers split between the central government and its states can function effectively. Both issues will never be finally settled, but can go better as long as affected parties understand the need for continuous improvement and redesign.

The National Regulatory Research Institute

The NRRI (National Regulatory Research Institute) is the official research arm of the state and federal regulatory commissions in the US. Even though the decision to set up such a research arm was taken in 1970, it took until 1976 for NARUC (National Association of Regulatory Utility Commissioners) to issue a competitive request for a bid to all the major universities in the US. It took another year to assess the bids and for the NRRI to be established in 1977. Preferring to set up the institute in a state as opposed to being in the seat of the federal government, Washington, DC, the NRRI was located in the state of Ohio. As it was thought that linkages and partnerships would better flourish in a university setting, the NRRI was located at the Ohio State University.

The institute has a 17-member board of directors, 11 of whom represent state public utility commissioners. Three members are from the Ohio State University and three others are distinguished academics from around the country. The funding is voluntary – each state is assigned a proportional annual assessment and voluntarily gives its contribution. The states can choose not to contribute. Reliance on voluntary funding helps ensure that the institute does research that is useful to its clients. The state commissions provide 85% of the funding, the Ohio State University gives 10%, and 5% comes from miscellaneous contracts. The board of directors establishes the research agenda every year, aided by an external research advisory committee composed of academics and senior state commission staff.

Even though the federal commissions are members of NARUC, by tradition, the states have dominated the national association. In cases where the states have not favoured a proposed policy or notice issued by a federal commission for proposed rule-making, the states have made appropriate comments and even taken action in the courts. This relationship has matured over time. Currently, federal and state regulators have effectively compartmentalized issues so that even if there are disagreements on certain issues, there will continue to be cooperation on other issues.

Contextual factors

At the federal level, the commissions tend to cover a single sector, whereas in the states they are multi-sector. Thus, there is the FERC (Federal Energy Regulatory Commission) and the FCC (Federal Communications Commission). At the state level most of the work is combined and the state commissions regulate everything from electricity to gas, telephones, and water. Some state commissions also regulate insurance, taxicabs, and garbage dumps.

From day one there has been a commitment from the NRRI board, the university, the institute's clients, stakeholders, and academia that it would be independent and its work would be objective. The institute is primarily involved in research, technical assistance, and education. To understand how the NRRI evolved, it is important to know that the US has three major universities in this field – the Michigan State University, which is famous for the two-week 'camp' it holds every summer; the New Mexico State University, which has developed several well-known one-week courses; and the Ohio State University, which has a unique two-day tutorial in which the commissioners get to be alone with members of the NRRI.

One of the worst things that happens to newly appointed commissioners is the lack of a grace period. Commissioners are appointed one day and expected to know everything immediately; in reality, it takes quite some time to pick up information. Immediate access to educational resources is an important and effective way to help new commissioners go up the learning curve rapidly.

Traps to avoid

There are two types of traps that need to be avoided in establishing a policy-relevant research institute. The first is the 'basic research' trap. By virtue of their intellectual achievements, training, and personalities, many researchers prefer to work alone, do research, write it up, and then hope somebody uses it. Like most other research entities, the NRRI is trying to make its research more relevant to policy makers. It has developed the twin concepts of 'anticipatory research' and client-centred research. Anticipatory research means that the researcher identifies when in a policy cycle research is needed. The start date might be a month or 24 months before. The point is that the regulatory policy maker does not care when the research was started, just that it was available when needed. It is 'just-in-time' research. This allows basic or applied research to be done, depending on the lead time. Without using a forecasting approach, research institutes can find themselves only doing applied research. This approach requires that researchers develop policy forecasting skills. The client-centred approach requires that the research not be undertaken until specific clients are identified. This is not a funding issue, but rather a way of prioritizing the allocation of scarce resources. Candidate research topics without candidate users do not proceed. Relevance is effectively defined by having clients.

A research institute also needs to avoid the 'research as policy-making' trap. Often researchers will do policy research because they are interested in the subject. However, because their research is only one of many decision-making inputs, it may not sway the state commission or other government agencies. It may well be that the decision maker agrees with the researcher, but because of financial constraints does not implement the policy recommendations. There is a tendency for researchers to then become disillusioned. By linking research with the policy cycle, researchers can better understand the constraints regulatory policy makers are under and have a more realistic understanding of the probable impact of their research contribution. A research institute needs to manage itself to avoid both traps.

Research institute: an Indian solution

While developing your own research institute, it is important to identify who the clients will be – whether state commissions, the central government, vendors, or consumers. If, for example, consumers are the primary client, you would have to organize yourself quite differently from how you would if state regulatory commissions were your client. In practice, most tend to design an organization first and then try to sell its services. A better approach is to design an institute through a needs assessment. This will require more time, but would do a better job of ensuring that what you have or what you are proposing is what the clients really want. This congruence will generate the enthusiasm needed to get funding, resolve governance issues, and clarify your research agenda.

Successful research institutes play a number of roles, such as being brokers, facilitators, and educators. Each of these roles requires interaction between clients and researchers. It is not the traditional pure research approach, which is increasingly unsustainable in our rapidly changing regulatory environment. Once a research institute establishes a reputation for being objective, increasingly it will find itself in the role of being a broker – a source trusted by all parties and asked to do even more. Providing educational and training services is a quick way to gain credibility and a reputation for objectivity.

Inter-governmental cooperation

The central government–state relationship in the US is different from that in India, but has many important similarities. Three descriptive models help to characterize the types of relationships states have had with the federal government in the US. One is a hierarchical federalism model, where the federal government is in control and states are subordinate. In second model, dual federalism, the state government and the federal government have separate and distinct roles. Neither dominates, they are just separate. In the US, states regulate local telephone calls, whereas the federal level regulates interstate calls. This allows states to experiment, to be what one observer called, 'laboratories of democracy'. The 50 states could have 50 different telecommunications policies. The third model that we have evolved towards, that describes most of our activities, and the one you may find useful, is the cooperative federalism model. Most claim this model as the one they follow, but this is not always the case. It is hard to do and is more an art than a science. Each level of government has statutory powers and statutory responsibilities, but each recognizes that problems do not follow arbitrary political boundaries. The key concept is cooperation, and not who wins.

Cooperative federalism examples

Two recent and successful examples of the cooperative federalism approach exist. The first concerns a perennial problem, namely how can uniform standards that respect the sovereignty of states be employed. The second has to do with institutionalizing central government–state government cooperation.

In 1978, the US Congress passed PURPA (Public Utility Regulatory Policies Act) to establish, among other things, pricing standards. This occurred at a time when then President Jimmy Carter said the existing energy crisis was the moral equivalent of war. Energy prices had skyrocketed and many people were worried about poor people being disconnected for non-payment of their electric utility bills. What is particularly interesting is that in this crisis mode, the federal government chose to follow a cooperative model in its quest for uniform pricing standards. One of the standards was that the rates should be cost-based. Without really outlining what a cost-based rate was, the federal legislation mandated that there should be state hearings to discuss it. The legislation said that states had the flexibility to determine what their cost-based rates would be. Participation in the hearings had to be open to all affected parties, which was a way of ensuring a full consideration of the issues connected with cost-based rates.

Why did this standards approach work? It was successful because it allowed the federal and the state levels of government to each do what they do best. There was a recognition that 'one size does not fit all', and that the supply and demand conditions are not homogenous. Had there been only one mandated cost standard, the federal government would have had to spend most of its time trying to make the policy consistent for everyone and entertaining exemption requests. Under the standards approach, the federal government approved the proposals of the state as long as they had a public hearing that considered standards and listened to evidence and data that were presented. The states were productive because they had the freedom to make cost policies that reflected their state needs. Because many common issues were being simultaneously examined in the 50 states, there was no need to 'reinvent the wheel'. Each state could draw upon what was being formulated in other states. The hearings also ensured a public solution to state concerns.

The cooperative federalism standards approach did not require the pre-approval of the federal government. The fear of the federal government was that the states may all develop their own electric cost standards, which would result in 50 different sets of costing standards. In reality, the underlying economics and engineering conditions common to many electric utilities work to prevent such a situation, as no state can allow its system to develop in a manner that prevents it from importing or exporting power to its neighbours. The standards approach allowed for state flexibility and in return received a relatively seamless set of state energy policies faster and at lower cost than could otherwise have been expected.

A second, more institutional approach occurs through the use of federal–state joint boards. In the US, the federal–state joint boards only cover the telecommunications sector and not the electricity sector. These joint boards are not regulatory commissions and do not usurp the respective powers and duties of state or federal commissions. The boards have been established by federal legislation to deal with specific issues, such as universal service. Under existing legislation, a federal–state universal service joint board has been established. It has three federal commissioners and four state commissioners. The federal government appoints all seven commissioners, but in practice the selection process is characterized by a considerable amount of negotiation in order to ensure representation. The joint board conducts an investigation and makes recommendations to the FCC. The FCC can accept all or parts of it or reject it. The states have an important role given their majority vote. Unless the FCC decides it wants to follow a different direction, it is an effective way to develop consensus. It is important to note that the states do not speak with one voice. In a cooperative federalism approach, this joint board approach is particularly effective. It cannot manufacture a consensus where none exists, but is successful because it permits discussions to occur and negotiations in a more informal setting.

Conclusion

This brief presentation discussed some key design issues that a regulatory research institute may need to address. It also examined successful processes that can be used to ensure that central and state regulators are able to capitalize on their incentives to cooperate. At this stage in the development of a new regulatory framework, perhaps the most important thing is for all to show an understanding of a need for continuous improvement.

TERI,
New Delhi

S Sundar and S K Sarkar

Framework for regulation: the Indian experience

Transition to a liberalized environment: experiences and issues in regulation 39-53

Why regulation?

According to the Latin root, the word 'regula' means a rule. The *Oxford English Dictionary* defines 'regulate' as 'to control or direct by means of rules and restrictions'. Thus, regulation of the industry is a process, prescribed by laws, which controls or directs some decisions of firms in the public interest. Ideally, in a market with perfect competition, where the consumer is truly 'the king', the market mechanism would itself ensure that the interests of the consumer and the commercial interests of the provider of goods or services are balanced. Since markets do not function ideally, regulation is required to provide a substitute for that element of perfect competition. The purpose of regulation is to prevent profiteering, ensure the provision of a universal service, prevent self-destructive price competition, and protect customers, employees, and the environment from harm or damage resulting from the inappropriate behaviour of firms.

Government regulators prior to 1996

India's experience with regulation in the sense of control is not new. Till recently, all sectors of the economy were regulated. For example, in the infrastructure sectors, the governments or their instrumentalities owned, operated, and regulated services. The central government, the Central Electricity Authority, state governments, and state electricity boards regulate the power sector under the authority of the Electricity (Supply) Act, 1948 and Indian Electricity Act, 1910; the Department of Telecommunications regulates the telecom sector under the Indian Wireless Telegraphic Act, 1933 and the Indian Telegraphic Act, 1885; the central government, state governments, Directorate General of Shipping, and dock labour boards regulate the port sector under the Ports Act, 1908, the Major Port Trusts Act, 1963, the Merchants Shipping Act, 1958, and the Dock Workers (safety, health and welfare) Act, 1986. In addition, there are other regulators created under various other acts relating to environment, safety, labour, etc.

Regulation as it existed then, and still continues to exist in several areas, is rooted in the belief that only the public sector can provide basic infrastructure services, that the entry of the private sector should strictly be regulated if it cannot be altogether prevented, and that the public sector agencies providing services should serve the interests and compulsions of the government. There was no attempt to distance the government's role as the policy maker and protector of public interest from its role as operator or provider of services. In fact, considerations of efficiency, productivity, and consumer interests were not of any importance. There was also the implied belief that accountability to the government and through the government to the Parliament or the legislature was adequate to ensure transparency and that no objectivity in regulation or disclosure to the public was necessary. This form of regulation or control inevitably resulted in

- unlimited discretionary powers to the service providers
- operational inefficiency and poor quality of service
- lack of transparency in the decision-making process and of accountability
- high barriers to entry and negligible flow of private capital
- financial mismanagement
- lack of protection of consumer interest with non-competitive prices at the consumer end and highly restricted consumer choices.

Requirements for sound regulation

In India, as in many other countries of the world, there is now a policy thrust towards the privatization and commercialization of infrastructure services, a thrust caused by several pragmatic non-ideology related factors. However, despite possibilities of competition, as the infrastructure services still retain strong monopolistic elements, governments have to continue being responsible for both providing a level playing field for the investors and protecting the consumers from exploitation. Commercialization of infrastructure and unbundling of services can also lead to considerable increase in transaction costs which need to be mitigated. These objectives now provide the rationale for regulation. An appropriate regulatory framework is essential for promoting public–private partnership in the delivery of infrastructure services.

This paper makes an attempt to identify what this appropriate framework should be and what the basic requisites of sound regulation are. It then examines to what extent these requisites have been addressed in the regulatory laws enacted so far at the national level. Finally, it raises issues that need to be addressed in the future. The basic requirements of sound regulation have been grouped under (1) scope or functions, (2) autonomy, (3) accountability, and (4) powers of the regulator.

Scope The scope of regulation has varied from country to country and within countries from sector to sector. Questions regarding whether the regulator should also be responsible for regulating the entry of the private sector, awarding concessions or issuing licences, and managing the process of privatization have not been answered conclusively. For example, the electricity regulators in Pakistan, Maine (USA), and Australia have the power to grant licences, whereas the regulator in Israel does not. Similarly, regulators in the telecom industry in the UK, The Philippines, and the US can issue licences and allocate frequency, whereas regulators in Australia and Canada cannot. However, universally, the scope of regulation has, inter alia, covered (1) regulation of tariff, (2) ensuring the quality of service, (3) improving efficiency and productivity, (4) protecting consumer interests, (5) ensuring fair competition in the sector, (6) speedy resolution of disputes between different players, and (7) preventing cartelization.

Autonomy Any move to separate the regulator from the executive, which has and will continue to be a major provider of services, has to be predicated on the regulator being independent of the executive for its survival and functioning, and having full freedom to exercise its powers. The autonomy of the regulator has to be guaranteed by law and not left to the magnanimity of the executive. The law should ensure that the regulator is in a position to perform its role independent of government approvals. This can only be achieved through a regulatory framework which provides for

- clear qualification criteria for the regulators, prescribed appointment process, and prescribed tenure
- delineation of the powers of the regulators and the government
- sufficient legal authority
- the regulators to hire the best available expertise and incur expenditure without having to obtain government approval
- autonomous funding which is not subjected to a budgetary process.

The relationship between the government and the regulator is somewhat unclear when it comes to the question of the government issuing directives to the regulator in public interest. In any democratic set-up, the government should clearly have the prerogative to issue such directives. At the same time, autonomous regulation would call for such directives to be issued after taking into account the views of the regulator and would also enjoin upon laying the directives for scrutiny of the legislature and, if challenged, by the courts of law.

Accountability An independent regulator must be made accountable for its actions. Legislative scrutiny of the regulator's working, transparency in decision-making through open hearing and easy access to the proceedings, effective appellate bodies, external scrutiny of the regulator's conduct and the regulator's removal criteria, etc., are some measures to ensure accountability.

Powers For the efficient discharge of its functions, a regulator should have the authority to access information and documentation, call for evidence, and compel attendance in the proceedings. A regulator without any teeth will not be able to ensure the compliance of its orders or directions. The penal provisions must be stiff or else continued violation will occur. Penal provisions should also be made uniformly applicable across service providers. A regulator should have the authority to issue directions while discharging its functions. Any violation of its directions should be adequately punishable.

India's independent regulators

Against the backdrop of what should go into the making of sound regulation, we will now look at the evolution of regulation in India, more specifically at the regulatory arrangements in the telecom, power, and port sectors. In addition, we will look at the regulatory arrangements in the insurance sector, although insurance is in the financial sector, because the IRA (Insurance Regulatory Authority) is an authority which has been put together.

Reforms and liberalization of the Indian economy started in 1991/92 with the power and telecom sectors being thrown open gradually to private investment and competition.

The telecom sector was opened up in 1991 with private investment being permitted in the manufacture of telephone equipment. Value-added services were thrown open for private investment in 1992, and in 1994, the National Telecom Policy reiterated the government's commitment to further liberalize the sector. The guidelines of 1991 allowed private sector entry in the generation of power. This was followed by several initiatives to attract and facilitate private investment in the power sector. Private sector participation by way of leasing port facilities was permitted in 1994 and investment in the creation of new facilities in the existing ports or establishment of new ports in 1996. However, regulation in the power and telecom sectors was not contemplated or provided for as a part of the initial reforms process, unlike in the UK where the electricity industry restructuring and positioning of the regulator were simultaneous. In the case of the telecom and power sectors, the regulators came much later, whereas in the case of the port sector the decision to set up a tariff regulatory authority was announced as a part of the policy statement in 1996. In the insurance sector, the regulatory authority has preceded the opening up of the sector. This sequence would seem to indicate that progressively there is a realization in the government that reform cannot be put into force without independent regulation and that a regulatory authority should be set up. In the hydrocarbons sector, where the pace of reform is rapid, the regulator is not yet in sight.

To what extent do the laws setting up these regulatory bodies incorporate the requisites of a sound regulation? Annex 1 sets out the provisions of the TRAI (Telecom Regulatory Authority of India) Act, 1997; the PLA (Port Laws [Amendment]) Act, 1997; the ERC (Electricity Regulatory Commissions) Act, 1998; and the IRA (Insurance Regulatory Authority) Bill, 1998 under the categories of scope, autonomy, accountability, and powers.

Scope The scope of regulation in the four sectors differs widely. Whereas TRAI has been specifically mandated to regulate the telecom sector as a whole and advise on the timing of entry of players, licensing conditions, technical capability, etc., the CERC (Central Electricity Regulatory Commission) is essentially set up to regulate tariff for central generating agencies and for interstate transmission of power. On the other hand, TAMP (Tariff Authority for Major Ports) is only a tariff regulatory authority on the lines of a tariff commission and is not a regulator of port activities at all. The IRA is being assigned a bigger mandate, which is comparable with that of TRAI, in the insurance sector. Also TRAI and the IRA at the bill stage have been specifically mandated to protect the interests of the consumers, monitor the quality of service, and ensure compliance of minimum service obligations, whereas in the case of the CERC, these have been left as objectives of the CAC (Central Advisory Committee), without any clear indication of the value of the advice of the CAC or how such advice would be heeded. In the case of TAMP, these issues have not been addressed at all.

Autonomy Only TRAI and the IRA have been allowed to levy fees and charges, and have their own funds. The CERC and TAMP are wholly dependent on the government for funding. The CERC also requires the approval of the government for the creation of posts. Although this requirement has not been specifically mentioned for TAMP, it is evident that government approval is necessary as the government has to approve TAMP's budget.

The PLA and the IRA at the bill stage have a provision for superseding TAMP and the IRA respectively. Although the circumstances in which these bodies can be superseded have been spelt out, the decision to supersede is left to the discretion of the government, which could be a threat to their autonomy.

Neither the three Acts nor the Bill clearly defines the relationship between the government and the relevant authority. Even in the case of TRAI, whose recommendatory functions have been mandated in the Act, the Department of Telecommunications has shown disregard for TRAI's recommendations, and challenged the provisions of law. In the case of the CERC, the recommendatory functions are vague: to aid and advise the government in the formulation of a tariff policy and itself receive advice from a CAC in major areas of policy, issues of quality, consumer interests, etc. The Act says nothing about what the CERC will do with the advice received.

Accountability

In the ERC and TRAI Acts, it has been mandated that the regulators shall ensure transparency while exercising their powers and discharging their functions. Open public hearings, accessibility of proceedings, etc., are some of the processes used. In the case of TAMP and the IRA, no such specific provisions regarding transparency exist. TAMP has attempted to introduce transparency through its recent guidelines under the TBR (Transaction of Business Regulations), 1998. The government is the appellate body in the case of TAMP and the IRA.

Powers

TRAI is a civil court, the CERC is not, although it is a quasi-judicial body with the powers of the civil court for certain limited purposes. The IRA and TAMP have not been given any of these powers. TRAI has been declared a civil court and given powers under Section 195 and Chapter XXVI of the CrPC 1973, whereas the powers of the CERC have been restricted under Sections 345 and 346 of Chapter XXVI of the CrPC 1973. Thus, TRAI has full powers to prosecute for contempt of lawful authority of public servants, offences against public justice, and offences relating to documents given as evidence, whereas the CERC does not have these powers and can only summarily proceed in the matter of contempt. As pointed out earlier, TAMP has no powers even to access documents, call for attendance, etc. Again as regards penal provisions for non-compliance of orders, the provisions in the TRAI Act are more rigorous than those in the ERC Act while there are no such provisions in the case of TAMP and the IRA.

Relations between regulators at the centre and in the states

In a federal polity like India, the mechanism for interaction between the central and state regulatory authorities has not been structured and thought through. While the ERC Act has provisions which are more in the nature of guidelines, for the setting up of the SERCs (state electricity regulatory commissions), the Act does not address the relationship between the central and state bodies in dealing with interstate transmission issues. The role of TAMP has been restricted to the major ports, without any thought being given to the need for regulation of tariff in the minor or private ports and implication of tariff regulation in one category of ports without any regulation in the other category.

Flexibility

The regulatory laws do not provide for any flexibility for speedy and effective response to changing circumstances. Since a regulator facilitates the process of transition from the monopolistic market to a competitive economy, its form, functions, and scope cannot be static. It is possible that as services are unbundled and competition increases, certain areas presently regulated may at some future date call for no regulation. For example, in the power sector it is possible that at some stage generation or distribution may not require tariff regulation. Secondly, as an economy matures and becomes sophisticated, the approach to regulation may have to change. The traditional practice of regulating the rate of return of the utilities is already undergoing a change with concepts like performance-based regulation or marginal cost approach being introduced. Technological advances may also alter the boundaries of regulation, a possibility that is looming large with telecommunications and broadcasting beginning to use the same pathways. Ideally, therefore, there should be some provision in the laws or mechanisms to ensure that the scope and nature of regulation is continuously under review.

Summation

What emerges from the above discussions is that while the TRAI Act is, perhaps, the best of the lot, none of the three Acts or the IRA Bill approaches an ideal or model regulatory law. What is also evident is that there has been no uniformity in thinking or in the approach to regulation in the various sectors. Each regulatory authority is the result of the wisdom and genius of the concerned ministry and not of any cohesive thinking in the government as a whole on the approach to regulation. Interestingly, in the case of disinvestment a commission was set up to advise the government on the process whereas in the case of regulation there is no such body to advise the government in the introduction of the regulatory process in India.

Relevance of a research body

Against this background, a body such as the Regulatory Studies and Governance Division at TERI has some relevance. Continuing research on various issues affecting the regulators is clearly needed. In particular, there is a need for a body whose activities will, inter alia, include

- basic and applied research on relevant issues in regulation
- educational and training support to the regulator and regulated
- dissemination of information on regulatory decisions and their impact in India
- technical advice to consumer research forums as and when requested to enable their meaningful participation in the commission's proceeding
- advice to the government on utility restructuring strategies
- tracking international developments
- documenting experiences and dealing with cross-cutting issues
- study of the effect of the regulatory decisions against the stated objectives.

Future issues

The purpose of the Regulatory Studies and Governance Division and of this conference is to focus on the developments that have already taken place and draw a road map for the future. The following are some of the issues that need to be addressed and carried forward to the government.

- Should there be a task force or think-tank in the government to develop a rational and comprehensive approach to regulation, both in sectors where an authority has already been put in place and in sectors where regulation would soon need to follow?
- Should there be an overarching legislation across various sectors with sector-specific differences being covered under subordinate legislation?
- If so, what should feature in this legislation with regard to scope, autonomy, accountability, and powers of the regulator?
- To what extent should the regulatory authority be mandated to protect consumer interests, educate consumer groups, and address consumer grievances?

- What should be the regulator's role in a changing economic scenario? Who will initiate changes in regulation – the regulator or the government?
- How does one evolve a mechanism to avoid cartelization in a sector, and what should be the role of the regulator vis-a-vis the anti-trust bodies?
- To what extent should the regulator assess or grade the utility providers in terms of quality and consumer service, and how should one encourage this grading to influence the rating of a company or its standing in the financial market?
- Is there a need for a permanent forum for the regulatory bodies to share their experiences?
- Finally, and most importantly, how should governments be encouraged to shed their powers and leave regulation to authorities with the necessary objectivity and expertise?

Annex 1

Comparative provisions under the TRAI (Telecom Regulatory Authority of India) Act, 1997; the Port Laws (Amendment) Act, 1997; the ERC (Electricity Regulatory Commissions) Act, 1998; and the IRA (Insurance Regulatory Authority) Bill, 1998

Subject	TRAI	TAMP	CERC	IRA (proposed)
Scope				
Objectives under the Act through which the regulator was created	Regulate the telecommunication services and for matters connected therewith and incidental thereto	Not specified	Rationalize electricity tariff, transparent policies regarding subsidies, promote efficient and environmentally benign policies, and matters therewith and incidental thereto	Protect the interests of holders of insurance to regulate, promote, and ensure orderly growth of the insurance industry and for matters connected therewith and further to amend the Insurance Act, 1938; the Life Insurance Corporation Act, 1956; and the General Insurance Business (Nationalization) Act, 1972
Function	Determine rates; has recommendatory power on the issue of licences; regulate sharing of revenues between service providers; facilitate competition and efficiency; protect consumer interest; monitor quality of service; inspect equipment; settle disputes between service providers; advise government on telecommunications technology; levy fees	Frame a scale of rates at which, and a statement of conditions under which, services can be provided by the Port Trust or port property can be leased; and fix fees for pilotage, hauling, mooring, and other services rendered to vessels	Regulate tariff; promote competition, efficiency, and economy; advise government on tariff policy; adjudicate tariff; the CERC to receive advice from the CAC on major policy issues, and issues relating to quality, consumer, etc.	Regulate, promote, and ensure orderly growth of the insurance and reinsurance business; issue certificate of registration; protect interest of policy holders; training; specify the code of conduct; promote efficiency; promote and regulate professional organization; levy fees; control and regulate rates; prescribe the books of accounts; regulate reinvestment of funds; regulate maintenance of insolvency, adjudication of disputes between insurers and intermediaries, etc.
Consumer protection	Mandated to protect the interest of consumers of the telecommunications service, and has the powers to issue directions to service providers	No provision	The CAC to advise the CERC on protection of consumer interest, and the CERC will in turn advise the government on tariff policy which is fair to consumers	Mandated to protect the interest of the policy holders

Note CERC: Central Electricity Regulatory Commission; CAC: Central Advisory Committee; C&AG: Comptroller and Auditor General; TAMP: Tariff Authority for Major Ports

Subject	TRAI	TAMP	CERC	IRA (proposed)
Quality of service	Mandated to monitor the quality of service, inspect the equipment of service providers; issue directions to service providers	To lay down the conditions under which services would be provided	The CAC to advise the CERC on the standard of performance by utilities, matters relating to quality provided by the licensee	Shall specify the code of conduct for surveyors and loss assessors
Dispute settlement	Authority to settle dispute among service providers and between service providers and group of consumers	No provision in the Act	Arbitrate matters involving generation and transmission companies	Adjudicate disputes between insurers and intermediaries, etc.
Autonomy				
Finances	To have a general fund to receive grants, fees, charges and disperse salaries/ expenses	To be funded by the government; budget to be approved	Expenses to be charged on the Consolidated Fund of India; budget to be approved by the government	To have a fund to receive grants, fees, charges, and disperse salaries/ expenses
Staffing	Can appoint staff and officers as required	Can appoint staff and officers as required but posts to be created with government approval	Can appoint the secretary and determine the number, nature and categories of other staff, but with government approval	Can appoint staff and officers as required
Salary	Staff salary to be determined by regulations	Staff salary to be determined by regulations	Staff salary to be determined with the approval of the government, by regulations	Staff salary to be determined by regulations
Selection	Selection of chairman/ members to be made by the government	Selection of chairman/ members to be made by the government	Selection of chairman/ members to be made by the government on the advice of the Selection Committee	Selection of chairman/members to be made by the government

Note CERC: Central Electricity Regulatory Commission; CAC: Central Advisory Committee; C&AG: Comptroller and Auditor General; TAMP: Tariff Authority for Major Ports

Subject	TRAI	TAMP	CERC	IRA (proposed)
	Members debarred from further employment within two years after completion of tenure	No bar on members seeking further employment after completion of tenure	Employment within two years after completion of tenure	Debarred from further employment within two years after completion of tenure
Relationship with the government	No supersession	Government can supersede	No supersession	Government can supersede
	Bound by directions from the government on questions of policy in the interest of sovereignty and integrity of India, security of state, friendly relations with foreign states, public order, decency, or morality	To be guided by directions of the government in matters of policy involving public interest, to be given in writing; may express views before such directions	To be guided by directions of the government in matters of policy involving public interest, to be given in writing	Bound by directions from the government on questions of policy; can express views before such directions
Accountability				
Transparency	Transparency provisions exist	No specific transparency provision exists, but Authority's order to be made available in the office of customs and conservator, and open for inspection by anybody without fees	Transparency provisions exist	No specific transparency provision exists
External scrutiny	Annual reports to be submitted to the Parliament for scrutiny	No provision regarding external scrutiny	Annual reports to be submitted to the Parliament for scrutiny	Annual reports to be submitted to the Parliament for scrutiny
Audit	Accounts and audit to be certified by the C&AG, and be laid before the Parliament	No such provision	Accounts and audit to be certified by the C&AG, and be laid before the Parliament	Accounts and audit to be certified by the C&AG, and be laid before the Parliament

Note CERC: Central Electricity Regulatory Commission; CAC: Central Advisory Committee; C&AG: Comptroller and Auditor General; TAMP: Tariff Authority for Major Ports

Subject	TRAI	TAMP	CERC	IRA (proposed)
Appellate bodies	Orders of the authority is final, appeal lies in high court	Order of the authority not final, government can vary the same	Orders of the authority is final, appeal lies in high court	Order of the authority not final, government may vary the same
Removal process	Member can be removed by the government but only on the advice of the Supreme Court	Authority for removal is government	Member can be removed by the government, but only on the advice of the Supreme Court	Authority with the government
	Grounds for removal of members well specified	Grounds for removal of members well specified, and includes refusal 'to act or becomes incapable of acting'	Grounds for removal of members well specified	Grounds for removal of members well specified, and includes refusal 'to act or becomes incapable of acting'
Powers	Full powers under section 195 CrPC, to prosecute for contempt of lawful authority of public servants, offences against public justice, and offences relating to documents given as evidence.; full powers under chapter XXVI of CrPC with regard to offences affecting the administration of justice which include powers to order costs, summary trial for giving false evidence, to deal with cases of contempt, order imprisonment or committal for refusing to answer or produce documents, etc.	No powers	Restricted to sections 345 and 346 of the CrPC which provide for summary proceedings for contempt; none of the other powers enjoyed by TRAI under chapter XXVI of CrPC	No powers

Note CERC: Central Electricity Regulatory Commission; CAC: Central Advisory Committee; C&AG: Comptroller and Auditor General; TAMP: Tariff Authority for Major Ports

Subject	TRAI	TAMP	CERC	IRA (proposed)
	Authority can call for information, conduct investigations	No power to call for information, conduct investigations	No power to call for information, conduct investigations	Powers include calling for information, inspection, conduct inquiries, audit of insurers, intermediaries, etc.
	Judicial proceeding	Proceeding not judicial	Judicial proceeding	Proceeding not judicial
	Enforceability of orders as a decree of a civil court; no civil court to have jurisdiction in matters within the purview of TRAI	No such provision regarding the enforceability of its orders	Enforceability of orders as a decree of a civil court; no bar over civil courts	No such provision regarding the enforceability of its orders
Penal provisions for contravention of order	For wilful failure to comply with the order, fine up to Rs 100 000, and up to Rs 200 000 for the second and subsequent offence, and additional Rs 200 000 per day for continuous failure	Cannot impose penalty for non-compliance of orders	For non-compliance with the order, imprisonment up to three months or fine up to Rs 100 000, or both, with an additional fine of Rs 4000 per day for continuous failure after conviction of such offence	Cannot impose penalty for non-compliance of orders
Penal provisions for contravention of directions	Fine up to Rs 100 000, up to Rs 200 000 for the second and subsequent offence, and additional Rs 200 000 per day for continuous failure	Cannot impose penalty for non-compliance of directions	Fine up to Rs 100 000, with an additional fine of Rs 6000 per day for continuous failure after contravention of first such contravention	Cannot impose penalty for non-compliance of directions
Offences by government departments	Strict provisions to deal with such offence	No provisions to deal with such offence	No provisions to deal with such offence	No provisions to deal with such offence

Note CERC: Central Electricity Regulatory Commission; CAC: Central Advisory Committee; C&AG: Comptroller and Auditor General; TAMP: Tariff Authority for Major Ports

Subject	TRAI	TAMP	CERC	IRA (proposed)
Power to make regulations	On all functions, especially procedure on the transaction of business, salary, and levy of fees	On the procedure regarding the transaction of business and salary	On all functions, especially duty, etc., of the secretary, procedure on the transaction of business, salary of staff, etc., terms and conditions of consultants, manner for energy charges	On all functions, especially procedure on the transaction of business, salary, levy of fees

Note CERC: Central Electricity Regulatory Commission; CAC: Central Advisory Committee; C&AG: Comptroller and Auditor General; TAMP: Tariff Authority for Major Ports

TERI,
New Delhi

R K Pachauri

Issues in tariff/pricing: future directions for regulation of India's infrastructure sectors

Transition to a liberalized environment: experiences and issues in regulation 54-62

Issues in pricing

The process of setting tariffs and their regulation is governed by a number of considerations, which can be established on the basis of experience in various countries. Prices have to be determined on a forward-looking and dynamic basis, and they have to fulfil the objectives of efficiency and equity. Prices must be such that they promote innovation and competition, and ultimately lead to the welfare of the consumer, as was the case in the UK. And, to ensure efficiency of natural resource use through pricing and the signals that it provides, environmental effects and other externalities need to be internalized. Regulators in India have several options in adopting the principles that apply to tariff setting, and some of these are explored later in this paper.

Defining an evolutionary process

The structure of the industry and prevailing market conditions are an important determinant of the kind of framework that would be most effective in the regulation of India's infrastructure sectors. As analysed elsewhere in this volume, there is apparently a lack of common design in the establishment of various regulatory bodies in the country dealing with different sectors of the economy. This is not to say that identical structures are essential for each sector of the economy because clearly market conditions and the very character of the sector would determine the nature of regulation and regulatory bodies across industries and sectors. With the introduction of independent regulation, it is hoped that a process of evolution would be set in that would not only change market conditions but the very structure of the industry, particularly in respect of bringing in competition. Ideally, an effective process of regulation should lead to the mimicking of perfect competition in industries or sectors that would exhibit monopolistic powers in the absence of regulation. Consequently, it is understandable that different sectors of the economy in India support different types of regulation, but the ultimate destination of the evolutionary process should have some commonality and consistency. Considering the important differences between the specific characteristics of different sectors that are being regulated, we need to carry out a quick assessment of the status of the particular industry that is being regulated. Based on the assessment, we would need to come up with a path that defines the evolutionary process to be pursued. This is not necessarily something that has to be done formally, but at least the regulatory bodies responsible for specific decisions need to have some kind of a road map on the basis of which they would move ahead. Setting up regulatory bodies and ensuring their efficient functioning are part of the evolutionary process, and this may necessitate certain legislative and administrative actions as we go along. Undoubtedly the legislation currently existing in India is not satisfactory in all respects, and some amendments will be required to make this process effective. As far as consumer interest is concerned, we would progressively need to bring in a certain level of competition that actually ensures consumer welfare.

The US experience

The US experience in the electricity supply industry has been quite remarkable in the past few years. Two and a half decades ago, regulatory issues in the US had a set pattern – there was an established basis at that time because demand was growing steadily and economies of scale and technological change were bringing about improvements in the efficiency of operation. Because of this, there was a decline in the real cost of electricity. Regulatory challenges at that point of time were rather simple and the US followed a very simple rate of return form of regulation which was accepted by most state regulatory commissions and even at the federal level. But changes over the past two decades or so have led to growing competition and there is now an emerging market for power which has several players as can be seen in Figure 1. In 1997 there were 131 players involved in the marketing of electric power. The industry's top ten players reportedly account for the bulk of the business of power marketing, in terms of the volume of transactions handled. But this too would depend on a process of evolution, such that over time the volume of trade handled by the bigger organizations would reduce in size. The volume of trade according to Sioshansi and Altman (1998) is however not an accurate indicator of business profitability.

The UK experience

The UK experience differs substantially from the history and experience of the US. Notably, British regulatory policy has also been based on price cap regulation. The path that rate of return follows under this system is shown in Figure 2. Essentially, returns to shareholders increase immediately following

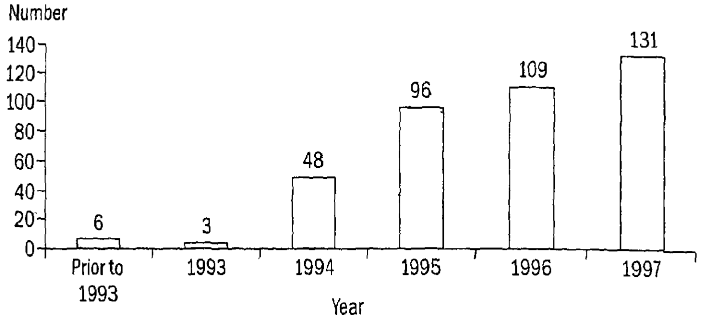


Figure 1 Growth of power marketers in the US, 1993-97
Source Sioshanti and Altman (1998)

the establishment of a price cap as a result of efficiency improvements and cost reduction. When the next regulatory review is held, the price cap would be reset leading to a reduction of the rate of return, but the same process follows between regulatory review periods. Of course, the potential for efficiency gains and cost reductions would reduce over time as the slack in the organization is eliminated after the fat inherited from state ownership vanishes. Yet, this does not eliminate the benefits of technological change and innovative methods of production, which could conceivably lead to periods of higher profit. In terms of the price paid by the

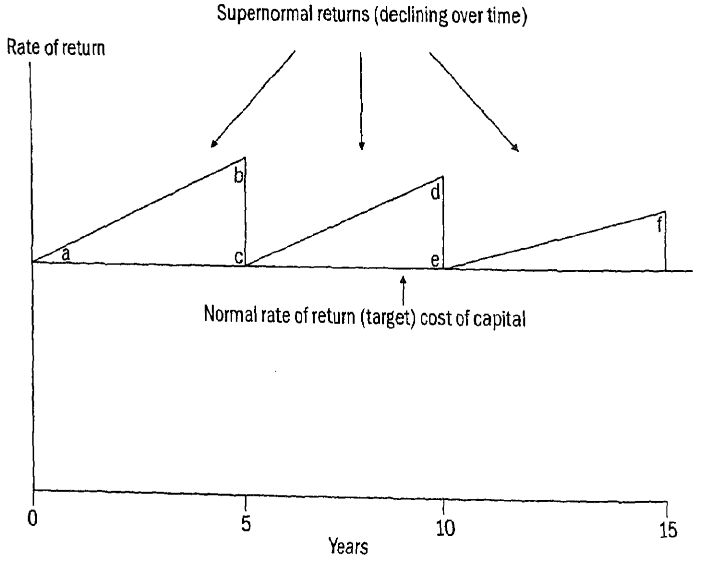

Supernormal returns (declining over time)
Rate of return
a
b
c
d
e
f
Normal rate of return (target) cost of capital
0
5
10
15
Years

Figure 2 The relationship between the price cap and supernormal returns
Source Parker (1997)

consumer, the UK experience has been generally positive, with benefits ultimately flowing to the consumer.

It is difficult to say which system would lead to greater consumer benefits, because in the US, growth in the size of the market and the introduction of new technologies have made competition highly feasible in recent years. The regulatory systems in place, however, were designed during a period when market growth and technological change were relatively steady and predictable. With increased competition, understandably there is now much greater pressure for deregulation in the US and for ushering in a period of necessary regulatory reform. In the case of telecommunications, market growth and technological change have been taking place at a phenomenally high rate. Also, the intercity market has grown far more rapidly than the local market. This has, in recent years, led to some organizations reaching almost a level of monopolistic power, necessitating changes in regulation for bringing in competition. It is possible that something similar may happen in the UK as well, once the initial period of regulatory change has been gone through.

Rate of return versus price caps

There is now a great deal of discussion and debate on the basic principles of pricing that should guide regulatory decisions. On the one hand, there is the use of conventional rate of return methods and on the other, there is the practice of imposition of price caps. Because of its simplicity and the fact that it is an established practice, the rate of return regulation is somewhat better accepted than price caps. Price caps are relatively recent and they raise a large number of questions regarding why a particular cap has been set. But there are those who strongly support the price cap approach. To quote Sir Christopher Chataway (1995), it is not so much the issue of price caps but the accompanying privatization that forces the implementation of efficiency measures, which in turn leads to large-scale reduction of the labour force, that makes it the subject of so much criticism. This has been the experience in the UK, and will likely be the experience in India. Discussing the rate of return regulation versus the price cap approach followed in the UK, Chataway (1995) quotes the example of the British Airports Authority, and agrees with the popular view that the system of economic regulation adopted in Britain does give an opportunity for high profits. As opposed to this, the US rate of return regulation sets a maximum on this variable, and any excess has to be passed on immediately to the customer in the form of price reductions. After reducing price by an average of six per cent in real terms each year, the British Airports Authority as regulated by the Civil Aviation Authority is not required to pass on to the customer any of the gains from efficiency improvements. He lists some of the merits of the UK system as the avoidance of what is generally referred to as gold plating in the US. The British system of RPI-x will, of course, over time tend towards the rate of return regulation level; but it is perhaps an effective way of bringing about quick price reduction and efficiency gains, given the history of government ownership of the infrastructure sectors.

Incentives for new investments and innovation

Pricing has to provide incentives for new investments and innovation. A policy that allows somewhat unacceptable levels of profits initially is not necessarily bad because it provides an incentive for investors to come in and it is only when the gains of competition start coming into the system that consumers start to benefit. As Prof. Littlechild pointed out, consumers in the UK have benefited enormously over a period of time. This may not be very apparent in the short run. But if you give the whole process a reasonable amount of time, the overall impacts are bound to be beneficial to the consumer. Therefore, in India, we are on a steep learning curve as far as price regulation is concerned. Because we have this enormous challenge of attracting new investments, we have to bring about improvements in the efficiency of several of our infrastructure sectors that are functioning very inefficiently. Therefore, while one could allow the luxury of waiting to learn slowly and then making regulation effective, one would probably lose out on opportunities which have a very high cost in terms of unrealized economic growth and development. It is vitally important that we chart out a clear road map and move along that rather quickly.

Integrated resource planning

In the case of electricity, but perhaps not applicable equally to other infrastructure sectors, regulatory decisions have to look at possibilities of integrated resource planning. And this is particularly so in a system that has very high inefficiencies. If new investment is to be made, one needs to look at opportunities across the board and see where that particular investment is most effective – in new capacity for generation, or improving transmission and distribution systems, or improving the efficiency of use at the consumers' end. Ideally, integrated resource planning has to be evaluated with the assistance of a suitable quantitative model in which the benefits from each increment of expenditure can be evaluated for different stages of the production and distribution cycle. Prioritization of resource allocation can then be arrived at on a rational and precise basis.

Matching regulation with public policy experience

It is also important to remember that we have to match restructuring regulation with public policy experience. In this context, we need to look at the experience of PURPA (Public Utilities Regulatory Policy Act) in the US (Perl 1997), which aimed to allow decentralized renewable energy cogeneration and other such opportunities to be able to provide power to the grid. PURPA was essentially brought in through pressure from the growing independent power industry, environmentalists, and, of course, those who wanted to exploit newer technologies that appeared on the horizon for smaller, decentralized, and diverse forms of energy production. Regulators responded to this legislation by allowing independent power producers and others long-term contracts, so that these projects could obtain appropriate financing. It worked on the principle which ensures that whoever is making the investments and is supplying the power is paid at a price which reflects the avoided cost of power that would have been generated if this particular option had not been exercised. The problem with the principle is that the avoided cost can vary over time and it is very difficult to predict how this might change. Therefore, investors and particularly financial institutions were not willing to provide the kind of investment that was required to make the best use of this particular opportunity. So, regulators stepped in to ensure that the contract that was given for pricing of power supplied either from, let us say, wind energy generators or cogeneration in industrial plants was of a sufficiently long duration. So, this was really an initiative taken by the regulators in the interpretation of a policy and this was not provided for in the Act itself. Therefore, efficient regulation in a sense should mimic what would happen in a perfectly competitive and market-friendly environment.

Assessing the regulatory assets base

Getting into the nitty-gritty of pricing, one area beset with serious doubts and questions is the assessment of the regulatory assets base. Essentially when privatization takes place, one has to arrive at an estimate of the assets of privatization. This is reflected in pricing decisions as well. To quote an example taken from the literature, if you were to set up a combined cycle power plant with 48% efficiency of conversion, and if the efficiency of the plant that is available four or five years later goes up to 53%, the corresponding loss of value in terms of assets of the earlier plant will be much higher than the depreciation that actually takes place. If there is such a rapid depletion in the value of the assets, then those who have borrowed in order to invest in that asset may not be in a position to pay back the full amounts that have been borrowed. Therefore, one would have to build in some kind of a risk premium that somehow insulates the investor from the risk that would take place (Newbery 1997). The extent and possibility of risk would depend on the kind of technology or infrastructure one is dealing with; for example, in the computer business obsolescence is taking place at a rapid rate, and this needs to be anticipated in terms of the financial risk involved.

Dealing with inefficiency and surplus labour

Other issues not peculiar to India, but particularly severe in India, are inefficiency and surplus employment. Bringing about efficiency gains and passing the benefits on to consumers raise the question of how best to deal with the enormous problem of surplus labour. How this transition is brought about becomes an important issue of strategy that must be embedded in pricing decisions. Undoubtedly, there are no clear-cut answers and there will be enormous conflicts between different players and different stakeholders. But this is an issue that will be important in the case of India. I suspect the most difficult issue facing the privatization of the distribution end of the power sector, about which there has been talk for some time but no tangible results except in Orissa, is the question of surplus labour. A great deal of intellectual effort and consensus building will have to go into dealing with this problem.

Regulation of prices versus environmental standards

By and large, in most countries environmental standards are laid down by federal agencies, whereas regulation of prices takes place on a decentralized basis. This is typically so in the US and will be the case in India too. While the price regulator is not necessarily involved in setting environmental standards, there could be some conflict between the two. Here again, environmental standards are likely to change over a period of time and prices will have to reflect to some extent the internalized cost of future changes that would come about. Very often, the plant or equipment itself will have investments that ensure a perceived environmental requirement that will have to be met in the future. So in some sense, investors are buying certain levels of risk. And we have seen the enormous change that has taken place in this country.

One of the biggest challenges that regulators in India would face relates to the inclusion of environmental standards. There are two divergent pressures that would be brought to bear on them in such decisions. The first set of pressures would come from the industry itself that views environmental compliance as an unnecessary and expensive luxury. On the other hand, environmentalists would take a totally different view requiring strict and rigid enforcement of environmental standards on producers of regulated services. One estimate for the US indicates that two per cent of the gross national product is the cost of complying with environmental regulations for the economy as a whole. In the case of the electric power sector existing regulations could add 10% or higher in the cost of constructing a power plant, as well as increasing operating costs (Andrews and Govil 1995). Regulators will have a difficult task of estimating externalities for the environment, and internalizing them as part of the price to be paid by consumers. This would also lead to conflicts between state and central regulators as has been the case in the US. In general, state level regulators were somewhat lax in enforcing environmental compliance, and much of the pressure in recent years has come from the federal laws and regulations.

Conclusion

Essentially, we need to chart out a clear path on how evolution will take place with regulatory measures in this country. As part of this, we not only have to lay down certain methodologies and processes but will also have to think in terms of the enhanced powers, the sharpening of actions, that will take place as a result of legislative action. We have made a beginning, but there is enormous disparity between the different regulatory bodies and perhaps each one of them will move at a different pace at different stages. But we need some kind of a common framework for all of them, and more importantly we need a very specific trajectory of change in the evolutionary process that each particular sector will have to follow in the years ahead.

References

Andrews C J and Govil S. 1995
Becoming proactive about environmental risks – regulatory reform and risk management in the US electricity sector
Energy Policy 23(10): 885–892

Chataway C. 1995
Economic regulators – are we an endangered species?
Utilities Policy 5(3–4): 251–256

Newbery D M. 1997
Determining the regulatory asset base for utility price regulation
Utilities Policy **6**(1): 1–8

Parker D. 1997
Price cap regulation, profitability and returns to investors in the UK regulated industries
Utilities Policy **6**(4): 303–315

Perl L J. 1997
Regulatory restructuring in the United States
Utilities Policy **6**(1): 21–34

Sioshansi F P and Altman A. 1998
Wholesale power marketing in restructured electricity markets
Energy Policy **26**(14): 1099–1104

National Council
of Applied
Economic
Research,
New Delhi

Rakesh Mohan

Tariff reform and regulation

Transition to a liberalized environment: experiences and
issues in regulation 63-66

Issues of concern

The problems associated with tariff reform and regulation will be with us for a long time to come. However, the first, and to me the most important, issue to focus on in the Indian economy today is that the key fiscal problems in the country are related to utility tariffs. This is true of most sectors such as power, irrigation, and other areas of infrastructure, water supply, state road transportation, and, to some extent, the Railways. The *Economic Survey* of the Ministry of Finance documented in 1998 that

- the total amount of implicit subsidies on merit goods comes to a little over 10.7% of the GDP (gross domestic product), which is a little higher than the total fiscal deficit of the states and the centre combined
- all the implicit subsidies being given in the current system in these and other sectors is somewhat greater than the total fiscal deficit.

The issue of economic pricing for utilities is, therefore, of utmost importance. The survey also documented that the total losses of the state electricity boards due to wrong pricing and other losses would be about 250 billion rupees in 1998/99. If the correct tariffs were being collected, we would not need any foreign investments in the power sector! Therefore, the issue of setting up well-functioning tariff authorities or regulatory authorities for infrastructure is important not just for the individual sectors but for the Indian economy as a whole.

Another major issue is that most of the infrastructure sectors are making losses, except the Railways, telecom, and ports sectors. However, there is little rationality in the tariff structures of even these infrastructure entities. There are cross-subsidies and other problems in the tariff structures in each of these areas as well. The problem is that these suppliers of infrastructure have been owned by the public sector; therefore, in some sense, both the government and the consumers regard the tariffs more like taxes, thus hindering the reforms process.

The Honourable Minister for Communications pointed out that the problem in India is that people are poor and cannot afford to pay. I have not yet seen a poor person with a telephone in his house. As for electricity, 60% of the rural houses in India are not connected. I presume they are the poor, not the rich. Even in urban areas, 20% of the urban households do not have a power connection, illegal or legal. I presume they are also not rich. Around half the households even in urban areas do not have a tap in their homes. So the poor definitely do not benefit from the subsidies given in the provision of urban water supply. This and other such examples show that the issue of tariff setting is beset by historical problems and attitudes evident in the country both among the consumers and among those in the government.

As these attitudes will be extremely difficult to change, it is important that the regulatory authorities are set up such that they have power, expertise, and acceptance. A consensual process is very important. And, the regulatory authorities do have to take into account the social or political realities in the country.

Objectives of tariff regulation

One of the main objectives of tariff regulation is to introduce competition. In some sense, the number one objective of a tariff or a regulatory authority ought to be to will itself out of existence as far as possible. If competition is introduced, there is no need to regulate. Regulation ought to be reduced over a period of time, making the sector much more self-governing with time.

Another objective is to improve efficiency in the services. If the pricing is wrong, either excess or subsidized, the consumers and the suppliers make wrong decisions, resulting in inefficiency. The regulatory authority should protect consumers; whether it ought to be the judicial authority for protecting consumers is a separate issue. As long as any sector in the market has monopoly power, regulation is needed to protect the consumers.

Tariff regulation ought to provide adequate returns, including providing resources for reinvestment. This is an important issue in India as the current stock of infrastructure in every sector is essentially owned by public sector entities. This means that if the stock of infrastructure services doubles over the next 10 years, it would grow by seven per cent a year. The public sector also has to invest in infrastructure right through this period, along with new private sector investment.

Problems with tariff setting

The key problem that arises in tariff setting is that of cost discovery. A principle which reflects the correct costs is essential. One must look at those costs in a monopoly or a duopoly situation which most closely reflects the costs that might exist in a situation of competition. One advantage that we have in India, but which we do not use, is that we have a long experience with price setting in the BICP (Bureau of Industrial Costs and Prices). One of the facts that we do not seem to realize is that the BICP, until very recently, has always been staffed by experts. These experts had a very good record given their task of acting as an expert body which was not influenced politically, and yet is relatively acceptable. The BICP in India set prices in the quasi-infrastructure sectors like steel, aluminium, cement, fertilizer, and pharmaceuticals. The huge amount of work done by the BICP is worth looking into. The one wrong thing that the BICP did, however, was to follow the system of retention pricing. One of the objectives is to introduce efficiency, and retention pricing does not introduce efficiency or incentives for efficiency.

Even in the BICP, there is always a problem of cost discovery. The BICP found it easier to get the information it needed from public sector enterprises rather than from private sector enterprises. And, in many cases, the prices were set without adequate information. It is very important to get the principles right at the beginning of the tariff setting process. As there will always be great difficulty in getting the actual data, long-run marginal cost is clearly the main guiding principle.

In the cost discovery process, apart from just the difficulty of getting information from the entities, it is necessary to build in the adequate returns. This ought to be resolved between regulatory authorities, and there is a need to look at the benchmark rate of return.

Other issues

Another issue that is common in India now is the foreign exchange risk issue. If there are imperfect foreign exchange markets, there is a lack of foreign exchange fluctuation protection. This will result in putting too much risk on the foreign investor or lender, and a higher rate of return will be required to account for the higher risks, leading to the consumers being made to pay higher tariffs. On the other hand, the investors ought to bear some risks. In infrastructure sectors, in-between solutions are required, i.e., neither pushing all the risks on the investor nor on the government. It is also not advisable to pass all the risks for the foreign exchange fluctuations that are inherent in a developing country on to the consumer.

Some innovation is required to find ways and means in tariff setting that provide for the self-selection of those who need the subsidy. The simple method is to have much lower pricing at low load times in all services, though it will be inconvenient for the less well-off to use the services at that time. However, that is what self-selection is. If you cannot afford it, you would need to use the service at an inconvenient time to get much lower prices. If we set our mind to it, we will be able to find more innovative ways of addressing these social needs without burdening the system with as much subsidy as we do currently. Therefore, we need to think more creatively on the cross-subsidy and social issues.

Regarding the relationship with quality levels, we should be thinking in terms of providing incentives for better quality delivery and its technical measurements.

Sequence of reforms

In India, the infrastructure pricing process will move slowly to reach economic levels of tariffs. The average tariff will have to rise as it is currently too low in most sectors except perhaps in the telecom and ports sectors. Lowering tariffs can take place only in the next stage, as it has happened in the UK. But in India, we have to raise them initially. Then as we reduce inefficiencies, we have to aim to reduce tariffs and eventually reduce regulation and introduce more competition.

Therefore, the government must understand that it is not enough to staff regulatory authorities with retired civil servants. They must have much more expertise. We have done that in the past in the BICP. There is no shortage of experts in the country. And, retired civil servants are not the only ones with good judgement. They, of course, have good judgement, but others have it as well. This is very important as the kind of issues they are going to dealing with in the next 5, 10, to 15 years are very complex and technical. There is also the need for social judgement. But without good expertise, we definitely will face troubled waters.

Prescription of adequate accounting standards, i.e., the cost discovery process cannot be adequate unless there is a common accounting standard. This is one of the first things that the authorities will have to do. And, they need the expertise to do that. Public hearings for acceptability and for getting information are a must. In Australia, this is now being done systematically. Systematic attempts at international benchmarking is essential. We have to get information internationally regarding prices, the principles behind pricing, and the actual levels. This information will prove extremely valuable.

Power

Session 1 Regulatory framework

Session 2 Market structure

Session 3 Tariff setting

Session 4 Regulatory reforms: present and future strategies

■

Background paper
K Ramanathan and Gaurav Bhatiani

■

Regulatory reform in the state electricity sector
M G Ramachandran

■

Basic issues of regulation in the Indian power sector
D K Roy

■

Evolution of energy regulation in the United States
Linda K Breathitt

■

Transition to a liberalized environment: regulation and market structure
R V Shahi

■

Choice of a power market model for India
K Ramanathan

■

Reform and regulation in the Indian power sector
Sarah P Voll and Michael B Rosenzweig

■

Deregulation, privatization, and promotion of competition: an Australian success story
Sohail Hasnie

■

Creating a competitive electricity industry: restructuring in Massachusetts
James Connelly

■

Tariff setting for power: the Israeli experience
Chaim Elata, David Assous, and Moshe Tsur

■

Tariff reform in India: a review of directions and issues
Sanjeev S Ahluwalia

■

Availability tariff: an overview
Bhanu Bhushan

■

Power: tariff setting
Mary Clark Webster

■

Effectiveness of regulatory reforms: present and future strategies
Manubhai Shah

■

Regulatory reforms: expectations of rural energy and renewable energy sectors
B S K Naidu

■

Regulating technological change in the electricity sector: thinking beyond today
Ajay Mathur

■

Regulation in India: the next step
Jim Bever

■

Recent reforms in the Australian electricity supply industry
Allan Asher

■

Summary of question and answer sessions

TERI,
New Delhi

K Ramanathan and Gaurav Bhatiani

Background paper

Transition to a liberalized environment: experiences and issues in regulation 69-98

Introduction

The electricity industry forms a critical part of India's infrastructure and its continued expansion is necessary to ensure rapid economic growth and the overall success of the liberalization efforts. Recognizing the importance of ensuring that sufficient resources are available to meet the rapidly growing demand, the GoI (Government of India) initiated a series of policy reforms in 1991. The main objectives of the reform process have been to improve the performance of the industry, correct distortions existing in the tariff structure, ensure dynamic and sustainable growth of the electricity industry in India, and encourage and facilitate participation of private capital, wherever necessary.

Traditionally, the electricity industry in India has been regulated and owned by various government agencies and organizations. The role and participation of the private sector has been limited and confined to specific areas of small jurisdiction and consumer base. The government, through the authority conferred on it by different laws, has taken upon itself the role of the developer, promoter, and regulator of electricity.

The subject of electricity is covered under the concurrent list in the Constitution of India, implying that both the central government and the state governments have the power to legislate the sector. A number of organizations and departments perform specific tasks in aiding the development of the sector. These include the MoP (Ministry of Power, GoI), CEA (Central Electricity Authority), NTPC (National Thermal Power Corporation), NHPC (National Hydro Power Corporation), PGCIL (Power Grid Corporation of India Limited), PFC (Power Finance Corporation), REC (Rural Electrification Corporation), and SEBs (state electricity boards).

The total installed capacity, as on 31 October 1998, was approximately 90 000 MW with the share of hydropower being approximately 25%. In spite of significant capacity additions during the five decades following Independence, various parts of the country continue to experience shortages of energy and peak power. During 1997/98, energy shortage was of the order of 8% while the peak shortage was approximately 11%. The operational performance of the sector has been characterized by low PLF (plant load factor) and high T&D (transmission and distribution) losses. Lack of financial resources and a desire to improve the performance of the industry have been the key drivers of the reform programme.

The sector has witnessed significant and rapid changes during the past few years. These involve new policies for inviting private participation in the sector, setting up of independent and autonomous regulatory authorities, and increasing recognition of the need to operate the organizations in the sector on commercial principles. The need for reorganization was felt in view of the rapidly increasing demand to improve the functional performance of the industry and due to the resource constraint faced by the public sector enterprises, particularly by the SEBs, to invest in new projects. The main cause for lack of financial resources has been the lack of political will to increase the tariff to realistic levels. The subsidy and the cross-subsidies in the sector have led to a distorted consumption pattern and rapid growth of captive power plants. The essence of the reorganization has been to ensure financial viability of the organizations in the sector, provide better value to the customer, and attract private capital into the sector.

Reforms were initiated by the central government in 1991, when it introduced the policy to liberalize the sector and promote private investments in the sector. This policy focused initially on the generation side of the business. Its main objective was to add generation capacity in a short time frame through private capital by making the sector attractive for investments. Since then, a series of further measures have been initiated by the government to expand and refine the policy for the sector. Amendments were introduced in the Indian Electricity Act, 1910 and the Electricity (Supply) Act, 1948 to facilitate the process.

Developments in legislation on regulation

Central sector

The Indian Electricity Act, the Electricity (Supply) Act, and the Indian Electricity Rules provide the basic framework for the regulation of electricity industry in India. These are discussed in brief in Annex 1. These have been amended from time to time to reflect the policy changes and to make them suitable to the changing environment.

In 1996, the central government, along with the state governments, decided on the Common Minimum National Action Plan. The objectives of the plan were to initiate steps required to improve the performance of the sector at the central and state level in a time-bound manner. Setting up the CERC (Central Electricity Regulatory Commission) and the

SERCs (state electricity regulatory commissions) was a key element of this plan.

The central government passed the legislation enabling the setting up of independent and autonomous regulatory bodies at the central and the state levels in July 1998. This is a significant step towards restructuring the electricity industry in India and is expected to provide an environment conducive to the dynamic growth of the industry. The regulatory bodies are expected to promote competition, efficiency, and economy in consumption of electricity and in investments for the development of the sector.

This Act provides for the establishment of the CERC to regulate the tariff of the central generating companies and other generating companies in case of a composite scheme for generation and sale of electricity to two or more states and to regulate the interstate transmission of electricity undertaken by the PGCIL and other organizations, including the tariff payable to them.

The Act also makes provisions for the establishment of a state commission as an option (not as a mandate) to the state governments. The state government can establish such a state commission in terms of the Act for the purposes of determining the tariff/charges payable for the intrastate transmission and supply of electricity. The state commission will also regulate the working of the licensees and others involved in the electricity industry in the state. The functions of the CERC are outlined below.

- To regulate the tariff of generating companies owned or controlled by the central government.
- To regulate the tariff of generating companies other than those owned or controlled by the central government specified in Clause (a), if such generating companies enter into or otherwise have a composite scheme for generation and sale of electricity in more than one state.
- To regulate the interstate transmission of energy including tariff of the transmission utilities.
- To promote competition, efficiency, and economy in the activities of the electricity industry.
- To aid and advise the central government in the formulation of tariff policy which shall
  - be fair to the consumers
  - facilitate mobilization of adequate resources for the power sector
  - associate with the environmental regulatory agencies to develop appropriate policies and procedures for environmental regulation of the power sector

- arbitrate or adjudicate upon disputes involving generating companies or transmission utilities in regard to matters connected with the above-mentioned clauses
- frame guidelines in matters relating to electricity tariff
- aid and advise the central government on any other matter referred to the central commission by that government.

The enactment of the Regulatory Commissions Bill and the establishment of the CERC are positive steps. There are, however, a number of other measures, especially at the state level, which need to be initiated urgently to provide a comprehensive solution for restructuring the power sector. The Regulatory Commissions Bill has facilitated the setting up of state regulatory commissions and many states have indicated their willingness to set up the same. The states, however, also need to consider the option of enacting a reform bill to facilitate comprehensive reform, i.e., restructuring, unbundling, and corporatization of the vertically-integrated SEB and related aspects.

The other important issue relates to the phasing out of subsidy and cross-subsidy existing in the tariff structure of most of the SEBs. Clearly, this process would not be easy and will have to be graduated over a period of time. It would also require strong political will and commitment to the process of reforms.

State sector

In the recent months, a number of states have indicated their willingness to reform the power sector and to set up regulatory bodies. The main driving force to establish independent regulatory commissions is the need to rationalize consumer tariffs. The issue of rationalization of tariffs is linked to the inability of SEBs to pay for IPP (independent power producer) power. In such an environment, many states found that IPPs were simply not willing to invest as the projects seemed unviable.

Orissa

Orissa was the first state to initiate power sector reforms in the country with the enactment of the Orissa Electricity Reform Act in 1995. Significant progress has been achieved since then and the Orissa example has now become a precedent which many other states are following or are likely to follow. The OSEB (Orissa State Electricity Board) was dissolved and unbundled as part of the reform programme. The generation business has been hived off into two corporations, i.e., the OPGC (Orissa Power Generation Corporation) which took over the thermal plants of the erstwhile OSEB and the Orissa Hydro Power Corporation which took over the hydro plants. The transmission and the distribution businesses were entrusted to GRIDCO (Grid Corporation of Orissa Limited), which is the successor organization of the OSEB. The distribution business has been divided into four zones and is to be privatized by the end of financial year 1998/99.

Further, the OERC (Orissa Electricity Regulatory Commission) was established in 1996 as a part of the reform process. The powers and functions of the regulatory commission include issue of licences, enforcement of licences and regulation of licensees, promotion of economic efficiency and safety in transmission, distribution, and use, regulation of bulk supply and retail supply tariffs, collection of data and forecasting, and promotion of competition.

The OERC, since its inception, has issued licences for transmission and bulk supply, distribution and retail supply, and regulations for conduct of its proceedings and discharge of its functions. It has issued two tariff orders and its last tariff order was issued on 21 November 1998 for bulk supply and transmission tariff and retail supply and distribution tariff separately. It has issued orders giving consent for setting up captive power plants and for third-party sales. The future course of action of the OERC envisages approval of the grid and distribution code and formulating consumer grievance redressal machinery for the licensees. It is also working towards developing a regulatory MIS (management information system), issue of consumer rights statement, power system planning and security standards, operating standards, and holding of inquiry proceedings on the supply position in selected areas.

Orissa has followed the UK model in terms of unbundling of the generation, transmission, and distribution business. The approach has been to privatize the successor distribution and generation business at the earliest while the transmission business is to be privatized at a later stage. A number of states are likely to follow this model with Haryana and Andhra Pradesh having already enacted legislation on a similar pattern.

Haryana

The Haryana Electricity Reform Act was passed in 1998 and the Haryana Electricity Regulatory Commission was enacted according to the provisions contained therein on 17 August 1998. At the same time, the Haryana Electricity Board was unbundled and the generation, transmission, and distribution businesses were corporatized under separate activities. Two distribution zones were formed. It is proposed that the east zone would be privatized, with the government of Haryana retaining equity participation. An information dissemination programme has been launched relating to restructuring and reform activities.

Haryana has followed the Orissa model with secondary changes. The privatization of the distribution business at the first stage is limited to one of the two zones. This will provide an opportunity for comparison of performance of a private operator with the state owned utility. The programme is expected to proceed at a rapid pace when compared to Orissa and hence will provide useful comparison with performance in Orissa. Further, the socio-political environment in the state is significantly different from that in Orissa and successful implementation would not be easy and would require strong political will and adroit manoeuvring skills.

Gujarat

The Government of Gujarat initiated the reform programme in 1997. The principal components of the programme involved setting up an independent regulatory commission to restructure the GEB (Gujarat Electricity Board), modernize and upgrade the distribution system, and clear the backlog of connections for the agriculture sector. The state government notified the constitution of the Gujarat Electricity Regulatory Commission in November 1998 and the selection committee for selection of members has also been constituted.

The constitution of the Gujarat Electricity Regulatory Commission has been notified under the Regulatory Commissions Bill and the process of selection of the chairman and members of the commission is already under way. This process, however, will not provide a mechanism for restructuring the GEB. The state is thus considering separate state legislation providing for a comprehensive reform programme.

Andhra Pradesh

Well on its way towards reform, the Andhra Pradesh legislative assembly passed the Andhra Pradesh Electricity Reform Bill on 28 April 1998. Presidential assent has been received for the same. The government would now notify a date from which the new Act would come into effect, paving the way for the formation of an independent and statutory three-member power regulatory commission. The restructuring programme involves reorganization of the APSEB (Andhra Pradesh State

Electricity Board) into two corporations under the Companies Act, India namely the APGENCO, having the generation business of the state, and APTRANSCO, having the transmission and the distribution business. APTRANSCO would be in the business of purchase of electricity from various sources, transmission, and supply of electricity. It will procure power from APGENCO, APGPCL, central generating stations, neighbouring states, and IPPs, and will supply it to distribution companies.

The state has also drawn out a detailed timetable for reforms. After the notification of the Reform Act in January 1999, the state now plans to unbundle and corporatize the generation, transmission, and distribution businesses. Distribution is proposed to be separated into three different companies. The privatization of the distribution companies has been scheduled for the end of the year 2000.

Andhra Pradesh has followed the Orissa model and the first phase of the reform programme is about to be completed. It is expected that the progress will be rapid as compared to Orissa as the state has, in the recent past, demonstrated strong political will to improve the infrastructure and to attract private investment into various sectors of the economy.

Other states

A number of other states including Rajasthan, Karnataka, Tamil Nadu, Madhya Pradesh, and West Bengal are in the process of setting up state regulatory commissions and restructuring the power sector. West Bengal is reportedly following a significantly different structure whereby all the distribution in the rural areas is handed over by the board to a new organization called the State Rural Electrification Development Corporation. This organization is expected to be structured as rural cooperatives buying power from the SEBs and managing their affairs at a local level. A number of different structures and variations within structures are being undertaken in different states.

Market structure

Supply side

The electricity industry in India has traditionally been owned and operated by government organizations. The MoP is the primary body responsible for the development of electrical energy in the country. Under the central government, there are several agencies and power generating and transmission entities, that function under the administrative guidance of the MoP.

The construction and operation of generation projects in the central sector are entrusted to central sector power corporations, namely the NTPC, the NHPC, and NEEPCO

(North Eastern Electric Power Corporation). The NPC (Nuclear Power Corporation), under the administrative control of the Department of Atomic Energy, is responsible for the nuclear power plants.

The PGCIL is responsible for all the existing and future transmission projects in the central sector and also for the formation of the National Power Grid. The PFC provides term finance to projects in the power sector. The REC, under the MoP, funds programmes of rural electrification.

The responsibility of generation, transmission, and distribution of electricity in the states is entrusted to the SEBs and state electricity departments. Most of these are vertically-integrated utilities under the direct control of the State Ministry of Power or Department of Power. The SEBs were established in various states pursuant to a mandate contained in Section 5 of the Electricity (Supply) Act, 1948. There are 17 SEBs in operation and they generate over 70% of the electricity supplied in the country. Apart from generating, transmitting, and distributing power, SEBs are also responsible for fixing tariffs and collecting dues from the consumers. The Electricity (Supply) Act, 1948 envisaged the SEBs as economic and efficient organizations operating on quasi-commercial principles.

Private utilities form the smallest part of the power sector in India and their role till the beginning of the reform programme was confined to specific areas of small jurisdiction and consumer base. The private sector organizations in the power sector have performed consistently well. They have generally been profit-generating organizations and are now regarded as role models for the new companies entering the sector. The major players in the private sector have been the BSES Limited, which distributes electricity in Mumbai, Maharashtra; CESC Limited in Calcutta, West Bengal; Tata Electric Company Mumbai, Maharashtra; Ahmedabad Electric Company, Ahmedabad, Gujarat; and Surat Electric Company, Surat, Gujarat.

Demand side

The consumption of electricity in India has experienced a rapid growth during the 1990s. The growth has been consistently over 8% during this period, recording a growth of 8.5% in 1995/96. However, the growth rate increased at a somewhat lower rate during the past two years. The per capita consumption has increased from 253 kWh in 1990/91 to 335 kWh in 1995/96 at a CAGR (compound annual growth rate) of approximately six per cent. The number of consumers during the same period has grown from 82 million to

86 million. Most regions of the country continue to experience significant shortages with peak deficit being 11% and energy shortage being 8% during the last year.

Industry has traditionally been the single largest consumer of electricity in the country accounting for more than one-third of the total consumption last year. The share of industry in electricity consumption came down from 62% in 1980 to about 38% in 1995/96 despite high industrial growth. This is because the SEBs have, over the years, artificially inflated agricultural sales by including part of the commercial losses as sales in this category. This is reflected in the consumption of the agricultural sector increasing from 12% to approximately 31%. This has been possible because of lack of proper metering for this segment of consumers.

Drivers for regulatory reform and change in market structure

The functioning of the industry has been characterized by the inability to achieve need-based growth, and problems of operational, technical, and financial instability, which include high T&D losses, low PLF, poor finances of the SEBs, etc.

Economic and financial

Lack of financial resources with both the central and the state governments to take up need-based programmes for addition of generating capacity and development of T&D systems has led to the recognition of the fact that the development of the sector cannot be undertaken without the participation of private capital. The key aim is to make the environment attractive for investments by the domestic and the foreign private sector.

The widening gap between demand and supply has put the government under pressure to open up the sector and simplify the procedures and processes for approval of projects.

Political and managerial

The functioning of most of the SEBs has traditionally been characterized by extensive political interference. This constrained the managerial and functional autonomy of the SEB administration, often leading to decisions which were not based on commercial considerations. A number of social policy goals such as employment and price stability have often been interrelated to the government policies on the development of the sector.

Further, the electricity tariffs in most states are highly distorted with an element of cross-subsidy built into the tariff structure. The industrial consumers are supplied power at high tension and pay more than the domestic and agricultural consumers who are supplied at low tension. This is leading to an increase in captive power units which could eventually deteriorate further the already poor financial condition of the respective boards.

Technical and operational

The operational performance of the plants run by the SEBs has not been at par. The level of T&D loss is in most of the states is very high in comparison to international standards. This problem is often linked to the lack of financial resources and political interference in the functioning of SEBs.

Availability of reliable and quality power when demanded by the consumers has been lacking. The reform process has recognized the need for renovation and modernization of old plants and introduction of new and better technologies in the sector.

Restructuring of the sector and market development in the future

Since the early 1990s, it was clearly evident that fundamental structural reforms were needed to improve the performance of the electricity industry and to meet the rapidly growing demand. Reforms in the sector essentially focus on three issues (1) restructuring to improve efficiency of operation, (2) regulatory reform, and (3) competition and privatization. The reasons for poor performance, however, have been complex and diverse. Similarly, there are significant differences with respect to the current state of development, level of performance, income distribution, and social concerns related to pricing and availability of electric power, legal and political systems, etc., in different states. Hence, it is not advisable to apply a one-size-fits-all approach which can severely limit the performance improvements that the reforms expect to achieve.

Various models of structuring the industry have been mooted and applied in various countries. Based on the degree of monopoly existing in the electricity sector around the world, the three generic models detailed here could be considered.

Monopoly at all levels

A single company has monopoly over generation, transmission, and distribution of electricity to final consumers. Generation is not subject to competition and the customer has no choice of supplier. The model prevailed almost universally until quite recently.

Competition in generation

There is competition in generation but all the sales must be to a designated purchasing agency.

Retail competition or direct access

Here the customers choose their supplier. More than one supplier offers to supply electricity to consumers in an area. There is open access to the T&D system. Distribution is separate from the retail activity, which is competitive.

There are many dimensions to the choice of industry structure and many different variations exist based on the characteristics of the individual country. In India, the restructuring of the electricity board would involve unbundling its functions, corporatization of its functions in one or more corporation, transfer of assets, liabilities, personnel from SEB to corporation(s), etc. There are several advantages associated with the unbundling of generation, transmission, and distribution business. These include transparency and accountability in the performance of different functions, ensuring that all activities get a proper focus. Further, unbundling allows competition in the segments where it is likely to lead to an optimal solution or at least a benchmark comparison amongst the functioning of various units.

State electricity regulatory commissions – through notification or reform bill?

Since unbundling and corporatization involve complex technical and social changes, it is important that the restructuring exercise should have the legislative sanction as legislation carries the backing of elected representatives and hence public support. A legislative action is generally not open to challenge on grounds of mala fide and other similar grounds whereas an executive action can be.

With the enactment of the Electricity Regulatory Commissions Act, 1998, the state governments have two options for establishing the SERC. These are through a notification under the provisions of Section 17 of the Central Act or through a comprehensive state legislation with the requisite presidential assent.

Some state governments are reportedly choosing the first option as it precludes the need to go to the state legislature, refer the bill to the central government, etc. and may work out to be the quicker and easier method of establishing the SERC. However, this option has certain inherent drawbacks. First of all, the Central Act does not provide for restructuring of the electricity industry in the state, which should also be an integral part of a reform programme. If an SERC is set up through a notification, the state government will have powers to curtail its power or even demolish it at a later date through a simple notification without going to the state legislature. Further, political will and bureaucratic zeal will be important factors to ensure successful implementation of a reform programme. Thus, it is all the more desirable that the state government takes the initiative and owns the reform programme.

Role of the regulator

The establishment of an independent regulatory commission is one of the basic requirements of the reform programme. The regulatory functions of the SEB will then be transferred to the commission and the role of the state government will be restricted to issuing policy directives. The commission should have full financial autonomy and it will be required to act in the interests of all stakeholders including the regulated utilities, consumers, state, and others concerned with the development of the industry. The specific functions of the commission would include, among others, the following.

- To promote efficiency, economy, and safety in the use of the electricity in the state particularly in regard to quality, continuity, and reliability of service and enable all reasonable demands for electricity to be met.
- To regulate the purchase, distribution, supply, and utilization of electricity, the quality of the service, the tariff, and the charges payable keeping in view the interest of the consumer and the consideration that the supply and distribution cannot be maintained unless the charges for the electricity supplied are adequately levied and duly collected.
- To regulate the working of the licensees and to promote it in an efficient, economical, and equitable manner.
- To require licensees and others to formulate prospective plans and schemes in coordination with others for the promotion of generation, transmission, distribution, and supply of electricity.
- To regulate the assets, properties, and interest in properties concerning or related to the electricity industry in the state.
- To promote competition, competitiveness, economy, and efficiency, while ensuring a fair deal to the customers and entities engaged in business of generation, transmission, and supply of electricity.
- To promote efficient utilization and conservation of energy, appropriate demand-side management, reduction of wastes, and losses in the use of electricity.
- To advise the state government on matters concerning electricity generation, transmission, distribution, and supply in the state, as the commission considers appropriate.
- To adjudicate upon the disputes and differences between the licensee's and to refer the matter for arbitration.

However, given the current status of market evolution, several issues have to be taken into account while ensuring autonomy, accountability, independence, and expertise available with the regulatory commission. Further, as the market structure evolves from being a SEB monopoly to competitive entities in the private sector, the regulatory authorities would need to demonstrate flexibility in approach. They will have to ensure that there are sufficient safeguards to protect the interests of the consumers and that the financial viability of the new entities is secure. They will encounter several implementation issues involving complex social, technical, legal, and economic issues in trying to achieve the stated objectives. They will hence need assistance on several fronts to ensure that they are able to meet the challenges set forth to them by a dynamic and evolving market.

In respect to the independence, autonomy, and accountability, the following guidelines provide the basic framework.

Independence

The regulatory authority should be provided full independence from political pressures – from ministries and from regulated enterprises, private or public. To ensure this

- the regulators should be appointed on the basis of professional rather than political criteria
- the regulators should be appointed for fixed terms and should have formal protection from arbitrary removal during their term
- their appointment process should involve both the executive and the legislature to ensure proper checks and balances
- they should not have been employed recently by the regulated utilities or other interest groups.

Further, there should be a cooling period between the end of their appointment and employment by parties with interest in the commission's decisions.

Autonomy

Autonomy would imply that the regulatory commission should have its own resources, based on its own funding sources (most common mode is through levies on regulated firms or the consumer of the regulated services), instead of relying on budgetary transfers. Further, regulators should have autonomy in staffing so that they can recruit staff with high levels of expertise. The tasks of the agency, not political considerations, should determine the size of the staff.

Achieving staffing autonomy in regulatory services often requires exempting them from civil service salary and recruitment rules. It might also mean recruiting external consultants as well.

Accountability

Accountability would entail transparency in the regulatory agency's decision-making process which requires the regulatory agency to publicly announce and invite suggestions regarding the initiation of a process to make policy decisions and to explain these decisions. The decisions of regulatory agencies should be open to judicial review. Accountability also requires clear simple procedural rules, which reduce possibilities of administrative delays; a multi-member commission, which reduces the possibility of abuse of power and sudden and dramatic changes in the policy with a change in the regulator; and defined rules and procedures for removal of regulators.

Tariff setting

Current rate policies

The current pricing method used by most utilities in the Indian electricity industry is the traditional cost-plus method. The regulatory mechanism for setting electricity tariffs is outlined in Schedule VI of the Electricity (Supply) Act, 1948. The cost-plus approach starts with the identification of costs which include the fixed costs related to capacity, the variable costs related to fuel, and other customer related costs. Then these costs are allocated as 'equitably' as possible among consumers through the tariff structure.

The guiding principles for retail tariffs are usually financial and social. Usually the policy makers would like the level of tariffs to be such that it meets certain financial criteria and the structure to be, in some sense, fair without penalizing certain groups arbitrarily. However, tariffs have evolved in an ad hoc manner in the past 30 years. Electricity tariffs have been used and are currently being used to meet several financial, political, and social objectives. The cumulative effect of such forces has created a complex web of tariffs in most states of India.

Typically, electricity prices in India are less than the cost of electricity production (average cost) and substantially less than the cost to build and operate a new power plant (marginal cost). During the financial year 1996/97 the average realization was about Rs 1.49/kWh while the cost of supply was about Rs 1.86/kWh. Compounding the problem of underpricing is the high level of T&D loss and poor collection rate from farmers and domestic consumers. Electricity prices are also low in India compared to utilities in a number of other Asian countries.

Underpricing of electricity is a serious issue in India's power sector. Underpricing encourages consumers to place little value on saving energy. In many states, electricity to the agricultural sector is not only underpriced but actually distributed free (for example, in the states of Punjab and Tamil Nadu). Most states follow a flat-rate tariff structure for their agricultural consumers where farmers are charged on the horsepower of their irrigation pumps and not on the actual electricity consumed. Subsidies for agriculture also create excess demand for electricity and disincentives for investments in conservation. More importantly, high demand makes power supplies unreliable, forcing consumers to maintain back-up generators, which results in macroeconomic distortions due to overcapitalization in the economy.

Problems with retail electricity pricing based on accounting costs also constrain efficiency investments for several reasons. Most customers pay for electricity based on total kilowatt-hour use over a certain period with no distinction between use in peak period (when electric power is expensive to supply) and off-peak period (when electric power is relatively cheap to supply). This lack of price signals discourages load management actions. Second, with the exception of large industrial customers, most customers do not pay for poor power factor. Poor power factor leads to increased T&D losses, thereby raising the cost of power delivered.

Any analysis of power tariffs should consider both the structure of tariffs and the costing methodology for rate-making. In the electricity economics literature, it is fairly well established that accounting costs are not relevant for resource allocation. One reason for this is that the accountant is concerned with recovering sunk costs, whereas for efficient resource allocation, it is the actual resource used or saved by consumer decisions that are important. Prices are the amounts paid for extra consumption, and need to be related to the incremental costs in meeting extra consumption. The accounting framework for tariff setting fails to capture this important principle. The estimate by the traditional approach may lead to over-investment and waste or under-investment and unnecessary scarcity.

Objectives of the pricing policy

The demand for electric power in India is growing at a rapid pace and the objectives of economic growth require that the pricing policy should promote economically efficient allocation of resources, both within the energy sector and between it and the rest of the economy. At the same time, however, every citizen's basic right to be supplied with a certain minimum amount of energy needs to be recognized. Recent studies in some of the states have demonstrated the willingness and ability of consumers, including agricultural and domestic, to pay for efficient and reliable power at rates significantly higher than those currently being charged. There is a need to reduce and gradually phase out the subsidies over a period of time, while at the same time improving the quality of supply.

Further, the pricing policy should ensure financial viability, autonomy, and speedy development of the energy sector. In India, this aspect has often been overlooked to provide subsidized power to agricultural and residential sectors. The utilities cannot function in vacuum, and tariffs have to be correlated to the quality of power supplied with incentives and penalties awarded for achieving the requisite standards and vice versa. The introduction of the performance-based tariff structure is expected to provide incentives to the utilities to improve the quality of supply and services provided by them.

On the consumption side, energy pricing is a very important tool for demand management, especially in the long run. Incentives for maintaining high power factor and for conservation during peak hours and seasons are required. Provision to impose penalties on those indulging in theft and violating the load control measures and adoption of proper incentives for metered supply should be a part of a pricing policy.

Finally, there are additional objectives such as the need for price stability, the need for simplicity in energy pricing structures, promoting regional development or specific sectors, and other socio-political, legal, and environmental parameters that need to be kept in mind. Thus, a large number of complex issues need to be addressed and apparently contradictory objectives have to be reconciled while designing an appropriate pricing policy. In India, the absence of reliable data and lack of infrastructure to implement innovative tariff structures further complicate the matter. Some progress has however been achieved with the initiation of reforms in Orissa and it is expected that as the liberalization of the sector gathers momentum these constraints will be removed.

Efficiency pricing: the case for marginal costs

The rationale for using marginal costs is the maximization of economic efficiency and social benefits. Pricing below marginal cost results in wasted resources because the cost of producing some units exceeds their value to consumers. Use of the marginal cost methodology promotes better utilization of capacity and avoids unnecessary investments to meet peak demands, which tend to grow very rapidly. The marginal cost approach permits the structuring of prices so that they vary according to the marginal cost of serving demands – by different consumer categories, at different times of the day, in different seasons, in different voltages, and so on.

The marginal cost approach is the basis for determining the fair price of energy provided by a new generator. Assuming that the inflation impact exceeds the cost-reducing impact of technological development, which is usually the case for most mature technologies, the embedded cost (of other generators already in production) is unlikely to provide sufficient financial incentive for new investments to come online. Hence, there is a need for adopting a marginal cost based PPA (power purchase agreement) for all new generators.

Moving towards LRMC (long-run marginal cost) tariffs in the retail segment will be the key to improving electricity efficiency. This is, however, easier said than done. There are several practical problems related to applying the marginal cost based approach in India. Traditional price regulation as carried out in India has been a socio-political exercise. It is unlikely that any government would allow the huge rate 'shocks', which moving towards LRMC tariffs would entail. Further, the revenue derived from charging marginal costs may differ significantly from the amount required to meet the financial needs of the licensee. This could either place the financial viability of the licensee in jeopardy or bestow on it a significant windfall, unless the regulatory commission intervenes to correct the discrepancy. The data requirements for adopting the marginal cost approach are more comprehensive and complex than those required for using the accounting costs. The kind of data required is generally not available with most SEBs and the MISs are either non-existent or are not geared to meet these requirements. Hence, as a first step, the marginal cost approach may be used only as a 'comparator' to provide signals to the regulator and the consumers.

Performance-based regulation

Performance-based rate-making strives to eliminate some of the control aspects of regulation and replace them with a system of incentives and penalties. The prices in such a system are generally fixed for a longer period than that in the cost-plus methodology. The PBR (performance-based regulation) system has distinct advantage in terms of providing an incentive to the utility to minimize the costs. This incentive however needs to be counter balanced by monitoring the prescribed quality standards so that the reductions in cost do not lead to a reduction in the supply standards. There are several mechanisms and parameters such as the generating plant reliability, T&D loss, outages at the customer level, customer complaint handling and satisfaction, etc., around which a PBR system can be designed. Most SEBs in the country are characterized by the lack of a proper MIS and reliable data to design a good PBR system. Hence, in the Indian context, at the outset only simple and easily measurable or quantifiable parameters should be included in the PBR system.

Transition strategy

The pace of reforms, especially the tariff rationalization process, will not be easy and is not possible in the short term. It will be constrained by several socio-economic factors from capability and willingness of consumers to pay for high cost power to a possible outcry and revolt against the incumbent regime. Political will is an important issue and will play an important role in determining the ultimate success of the tariff reform process on which the success of the reform programme will hinge. The following steps need to be initiated urgently to respond to the issue of rationalizing the tariff structure.

Establishing regulatory structure

Setting up a regulatory commission quickly is an essential task which needs to be undertaken by all states. The periodic revision of tariffs is a major problem as it has traditionally been a political decision. Many states in the recent past have dragged their feet for a long time over the issue, which has led to the deteriorating financial health of the SEBs. Setting up a regulatory agency to do the job would delink the government from what is considered to be an unpopular decision. The regulatory authority will take over this responsibility and set tariffs that achieve the twin objectives of ensuring financial viability of the entities in the sector and at the same time insulating small and marginal consumers from price shock.

Sensitizing public representatives

The political leadership all over the country has been extremely sensitive on the issue of subsidies and has strongly held the view that any tinkering with the subsidies would be politically damaging. The public representatives need to be sensitized to the fact that further continuance of subsidies would be disastrous to the development of the sector. Further, through the process of reforms, it is possible for the government to delink itself from taking unpopular decisions by setting up regulatory agencies to do the job.

Consumer education

Consumers in India have been the most neglected in the state-owned and -operated infrastructure sector. There are not many organized forums where an aggrieved consumer can voice complaints. Providing better quality of service and protecting the interest of consumers are key elements of the reform programme. At the same time, it is critically important for the people in the country to recognize that subsidies have resulted in a substantial loss to the SEBs and to the economy as a whole. A vigorous campaign to educate the people about the financial crisis of the SEBs and to make them realize that further development of the sector is not possible without availability of sufficient resources with SEBs, needs to be launched. A part of the exercise of consumer education and awareness will have to be carried out by the regulatory commission. At the same time, a movement will have to be initiated to educate consumers on their rights, collect and disseminate information on the regulatory decisions and their impact on different consumer categories, and spread awareness on the quality standards and mechanisms available for handling consumer complaints.

Graduating tariff shock

In spite of the improvement in the general economic environment and income levels, a substantial portion of the country cannot afford electricity services. The regulators will need a mechanism which ensures that low-income consumers do not lose access to electricity while raising prices to marginal cost. This apparent paradox can be solved in two ways. The classical solution will be to pay direct person-oriented subsidies to poor consumers and raise power prices instead of obliging utilities to reduce prices below costs and then shouldering the debt, as is the current practice in India and several developing countries. This method, however, is clearly impractical and an alternative could be to preserve low prices for the level of consumption prevailing before reform and raise prices at the margin. Consumers would then pay flat rates for current consumption levels, but prices would rise steeply if demand, especially the demand for higher (peak) capacity but not for longer utilization hours of the same capacity, were to increase. This would provide the right pricing signals for load growth.

Pacing of reforms and strategies for future action

There are different approaches to implementing the reform programme. There is a 'big bang' approach where unbundling, privatization, and introduction of competition are achieved in a single step. The other approach is a phased reform process where a relatively long transitional period is available to the utilities and the regulatory bodies to evolve according to a structured programme. The adoption of a particular approach would depend on factors such as the existing capacity of the legal, political, and social systems, performance standard of the existing infrastructure, complexity involved in implementing the big bang approach, the time required to evolve effective regulatory structure, and political will.

In India, the restructuring of the SEBs may be attempted in a phased manner to avoid the shock associated with a major changeover. This will ensure that sufficient time is available for regulatory bodies to start functioning effectively and will also provide sufficient time to convince all stakeholders of the benefits associated with the process.

As a first step, the activities of the SEB should be broken into separate divisions, which operate on commercial principles or as separate profit centres. This step is relatively easy to accomplish as it does not require any legislative action and does not mean shifting or reallocation of the staff. The activities can be divided into separate divisions based on the functional role, i.e., the generation, transmission, and distribution business should operate as separate divisions. It is possible to further subdivide the divisions – the generation business can be divisionalized based on the nature of the plants, i.e., thermal, hydro, non-conventional, etc., and the distribution business can be divisionalized on geographical lines into zones of manageable size.

The divisions should operate as separate profit centres and must be provided with full financial autonomy and functional independence. The dealings between the divisions should be on commercial principles and they should maintain separate books of accounts. These steps would identify clearly the performance of each of the divisions and highlight to the management the need for support, attention, and improvement at different places. The process of divisionalization would facilitate the eventual unbundling into separate companies.

The misconception that the reform programme ipso facto means either transfer of ownership to the private sector or privatization needs to be removed. Privatization is not an absolute necessity or mandate of the reform programme. Though privatization is one of the important vehicles for achieving the objectives, it does not mean that restructuring of the sector cannot be achieved without privatization.

At the same time there are several advantages linked with private sector participation in the sector. A private sector organization creates hard budget constraints, sets high performance standards, and depoliticizes the sector. It will ensure availability of the much-needed financial resources for development of the sector and also bring in skills available in the private sector. The GoI has already allowed the participation of the private sector in generation, transmission, and distribution businesses. A number of IPPs have already come on line and progress on several others is being made. The activity that needs increased penetration of the private sector is distribution.

The various models for private sector participation in distribution that can be considered are

- joint venture
- outright sale of assets to a private company
- public offering or flotation
- leasing/franchise/long-term concession, etc., of business to private sector
- management contract with private sector
- subcontracting part of the business or a small area of supply to cooperatives
- assigning a part of the distribution work, namely billing and recovery of money, maintenance of meters, and maintenance of small supply lines.

The joint venture model adopted has several advantages that are enumerated below.

- The state government will retain some say in the utility and can step in if the utility abandons or fails to perform. This is necessary as electricity supply is a public utility service and cannot be discontinued at any time. The risk of a private sector not performing can also be avoided. In the joint venture model, the state entity can be given control of the utility in case of non-performance by the private sector.
- Political and public perception discourages outright sale, lease, or disposal of public sector units.
- Employees' opposition to joint venture is less as compared to outright sale, lease, or disposal.

The disadvantages linked with other options are outlined below.

- The staff problem.
- Difficult to identify the assets to be sold in the absence of an inventory.
- A substantial amount may have to be invested by a private person to purchase the assets.
- Public offering or flotation can be done only for the whole corporation, i.e., the successor of the SEB. It cannot be

done for any particular division. This option, therefore, assumes that the entire successor company will vest with one participant. This may not be, therefore, feasible.

- A long-term lease franchise or a long-term concession will also have the same problem as mentioned in the case of an outright sale.
- The management contract does not give the participant an effective control over the employees.

In the context of the pacing of reforms, the following issues are important.

Experience sharing

The reform process in Orissa was initiated more than three years ago and since then substantial progress has been achieved in establishing the regulatory structure in unbundling the SEB and in moving towards privatization. There are several states that are likely to follow the Orissa model. It is important that the experience gained in Orissa is available to these states to ensure that the process is smoother and faster than that in Orissa.

The actual process in each of the states would be influenced by the circumstances in each of the states, the level of economic development, the political will, and the path adopted for restructuring the sector.

Confidence building among the management and labour

In the reorganization of any industry, the issues relating to transfer of employees are very delicate and at the same time of great significance. It is important to adopt a correct legal and pragmatic practical approach to deal with these issues.

Restructuring is often equated with retrenchment among the labour. The labour unions need to be reassured and training and skills imparted so as to make them more useful in the new environment. The engineers often feel that with privatization, further expansion of the SEBs would stop and their promotion avenues would decline. However, they need to be convinced that liberalization would bring in a much-improved scenario in terms of job prospects in the private sector and better emoluments.

The new environment will also require the regulated utilities to make several changes in their operations to come up to the expectations of the regulatory commission. They have limited institutional capacity and skills available to them to meet sophisticated data requirements and to successfully present their case. Understanding and appreciation of the new system will take some time and persuasion to make them aware of the benefits that will flow from the process. This will ensure the cooperation of the utilities, which will be vital to ensure the viability of the reform programme.

The new regulatory environment will demand new skills and expertise, which most managers (mostly engineers) do not possess today. Training and upgrading of skills will be one of the key issues to be dealt with in the SEBs in the context of regulatory reforms. This will ensure that the people do not lose motivation and are not made redundant by the new environment. Specialized cells dealing with regulatory affairs with expertise in technical, economic, legal, and accounting fields will need to be set up.

In this regard, it is important that the terms and conditions of service on the transfer should not be in any way less favourable than those which have been applicable to them under the current structure. Further, all benefits rendered before the effective date of transfer should be recognized and the period of service should be considered as continuous for the purpose of service benefit.

Research in regulatory issues

The restructuring exercise will throw up a large number of issues which will need insight and research from the perspective of different stakeholders. These inputs will be required at three levels (1) regulatory commissions, (2) regulated utilities, and (3) consumers. Debate and analysis of these issues and dissemination of information and findings will be important to ensure that the process is not hijacked by interest groups and that all objectives of the reform programme are achieved as envisaged.

Summary

The fields of regulation and regulatory economics are still under evolution in India. There are several questions and issues that need to be debated and analysed in this context. It will be critical to ensure autonomy, accountability, transparency, expertise, and credibility of the new regulatory regime if the process of regulatory reforms is to succeed. Further, a clear understanding and working relationship between the state government and the SERC and also between the CERC and the SERCs will need to be established.

Though the reform programme has been initiated in many states, the pace and the direction are still not clear. Some of the states are likely to follow the Orissa example while others may set up the regulatory commission under the Electricity

Regulatory Commissions Act, 1998. Political will is an issue which will play an important role in determining the ultimate success of the reform programme. Even where regulatory commissions are set up, the pace of reforms, especially the tariff rationalization process, will not be easy and is likely to extend over several years.

Annex 1

Brief description of legislation guiding the power sector

The Indian Electricity Act, 1910

The Indian Electricity Act, 1910 (hereafter, the 1910 Act) was passed by the Legislative Council on 18 March 1910 and came into force with effect from 1 January 1911. It deals with the supply and use of electricity and is applicable to the whole of India except the state of Jammu and Kashmir. The 1910 Act deals with the grant of licences to persons who wish to engage in the business of supply or transmission of energy and also for approval to non-licensees to undertake transmission, supply, and use of energy. The 1910 Act is in five parts. Part I deals with the preliminaries including definitions. Part II deals with the grant of licences for supply of energy and matters related thereto including the performance and functioning of the licensees. Part II A deals with licensing of transmission. Part III deals with the supply, transmission, and use of energy by non-licensees. Part IV deals with general matters including those concerning the use of electricity by institutions such as railways, aerodromes, the constitution of advisory boards, etc.

The Electricity (Supply) Act, 1948

After Independence, the Government of India enacted the Electricity (Supply) Act, 1948 (hereafter, the 1948 Act), which came into force on 10 September 1948. The 1948 Act came into force to provide for the rationalization of the production and supply of electricity and for taking measures conducive to electrical development.

The 1948 Act aimed to ensure coordinated development of electricity in India on a regional basis. The government felt that this was a matter of increasing importance for post-war reconstruction and development. Further, it was also felt that the absence of a coordinated system, in which generation is concentrated in the most efficient units and bulk supply of energy centralized under the direction and control of one authority, was another reason that was impeding the healthy and economical growth of electrical development in the country. It was also apparent that if the benefits of electricity are to be extended to semi-urban and rural areas in the most efficient and economical manner consistent with the needs of an entire region, the area of development must transcend the geographical limits of a municipality, a cantonment board, or a notified area committee, as the case may be.

It was therefore necessary that the appropriate governments should be vested with the necessary legislative powers to link together under one control electrical development in contiguous areas by the establishment of what is generally known as the 'grid system'. It was under these circumstances that the 1948 Act passed to facilitate the establishment of this system in newly licensed areas and to control the operations of existing licensees so as to secure fully coordinated development.

The government felt that it is not possible to legislate for this purpose within the framework of the 1910 Act, which was conceived for a very different purpose. Thus, on the broad lines of the Electricity (Supply) Act, 1926 in force in the United Kingdom, an appropriate legislation which will enable provincial governments to set up suitable organizations to work out 'grid schemes' within the territorial limits of the province was enacted.

The 1948 Act is divided into seven chapters and has nine schedules. Chapter I deals with the preliminaries including definitions. Chapter II deals with the constitution and functions of the CEA (Central Electricity Authority). Chapter III deals with the SEBs. Chapter IV deals with the powers and duties of the SEBs. Chapter V deals with the working and trading, etc., of the SEBs. Chapter VI deals with the SEBs' functions, accounts, and audit. Chapter VII deals with the miscellaneous provisions.

The SEBs came to be established in various states pursuant to a mandate contained in Section 5 of the 1948 Act. The CEA was constituted to develop sound, adequate, and uniform national power policies to coordinate the activities of planning agencies in relation to the control and utilization of national power resources.

The Indian Electricity Rules, 1956

The Indian Electricity Rules, 1956 were issued in the exercise of the power under the 1910 Act (Section 37) providing for procedural aspects such as obtaining of licences and for matters such as the general safety requirements, the general conditions relating to the supply and use of electricity and matters connected with the electric supply lines, overhead lines, electric traction, etc.

Amendments in the 1910 Act and the 1948 Act

The 1910 Act and the 1948 Act were amended from time to time to take care of the changing circumstances and requirements. The principal amendments have been the 1956, 1959, and 1991 amendments.

1956 Amendment

Section 57 of the 1948 Act was amended. The amended Section 57 provided for calculation of licensee's charges to customers in accordance with the provisions of Schedule VI to 1948 Act. Schedule VI provided in detail the financial principles and their application in calculating the licensee's charges. The intention has been to give a reasonable rate of return to the licensee but at the same time to ensure that if there is a windfall, a substantial part of the excess amount is ploughed back to the benefit of the consumers and upgradation of the system.

1959 Amendment
The 1910 Act was amended to make provisions relating to consumer benefits, exercise stricter control over licensees, provide for inspection of electric works, and installation of the central government.

1991 Amendment
In 1991 (pursuant to the liberalized economic policies of the government) the 1910 Act and the 1948 Act were amended by the introduction of significant changes. These included a provision for the grant of supply licence for an enhanced period under the 1910 Act (30 + 20 years) and the introduction of the concept of the generating company as distinct from the licensee and the board. The object of these amendments was to provide for greater participation of the private sector in the generation of electricity and also to make supply licences attractive by enhancing the duration of the licences. In the meantime the industrial policy was also changed to allow private enterprises in generation and distribution of electricity.

Annex 2

Issues to be highlighted for discussion at the conference

Session 1: Regulatory framework

- How to ensure independence, autonomy, and accountability of the regulatory commissions especially since there are no precedents and given the fact that the regulatory decisions have wide ranging implications?
- Is sufficient expertise available with regulatory commissions to analyse available information? How can they be assisted to ensure efficient and reliable functioning?
- What would be the role of the government under the new regulatory framework and how to ensure that the regulatory decisions are not usurped?
- With the enactment of the Electricity Regulatory Commissions Act, 1998 the state governments have two options for establishing the SERC (state electricity regulatory commission) – through the Central Act or by enacting a separate legislation. The pros and cons of each need to be analysed and debated.
- What would be the role of the CEA (Central Electricity Authority) under the new environment? To what extent does the role of CERC (Central Electricity Regulatory Commission) overlap with that of the CEA? How to ensure that the policies are consistent?
- What are the possible areas of overlap between the CERC and the SERCs? What happens in case of inconsistency or conflict between the CERC and the SERC?
- How to minimize delays in regulatory decisions?
- What could be a measure of performance of regulatory commissions?

Session 2: Market structure

- In the Orissa model, the generation business is not a licensed activity as it is supposed to be a competitive business. However, as a competitive environment is yet to truly emerge in the Indian scenario and most of the regions continue to suffer significant shortages, there is a possibility of the generators exercising monopoly power. As the power purchase costs account for more than 60% of the total input costs, an issue which needs to be debated and analysed is whether the generation business should also be under the direct control of regulatory commission. With the constitution of CERC, the tariff for central sector plants owned by the National Thermal Power Corporation, National Hydro Power Corporation, and for the IPPs (independent power producers) supplying power to more than one state would be regulated. However, other plants with almost similar technical and operational characteristics would continue to be outside the purview of any regulatory control.

- What should be the long-term strategy for developing a competitive market? What would be the choice for the transition phase?
- What could be the role of RLDCs (regional load despatch centres) in promoting short-term economy and emergency power exchanges?
- One of the main concerns of the IPPs is related to the inability of the SEBs to pay their dues to the power generating companies and fuel suppliers. Taking note of this problem, the Government of India has proposed the formation of a new entity, the PTC (Power Trading Corporation) to act as an intermediary between the SEBs and the IPPs with guarantee through the state funds available with the RBI (Reserve Bank of India). Though the formation of the PTC is a welcome step, it does not attack the fundamental problem of bankruptcy of the SEBs and it is not clear whether the proposed PTC will be able to remain financially viable in the long run.
- How are grid security and reliability affected by the changing market scenario?
- What should be the role of the system operator under the new environment? How will the regional grids be operated and economic efficiency in power exchanges ensured? Is there a need for an independent system operator?

Session 3: Tariff setting

- What are the possible alternatives for SEBs to reduce the subsidy and cross-subsidies in the tariff structure? How fast can they move?
- Due to rapid expansion in the number of consumers, most SEBs in the country today do not have adequate management information systems to cope with the information and data requirements of a sophisticated regulatory set up. In this context, what is the minimum set of requirements that the utility can meet and what is the realistic time frame in which the information requirements can be improved?
- The consumers in India do not have access to information and are not organized. Under such circumstances who will undertake the responsibility for representing and protecting the interest of consumers and how can this be achieved?
- Even the utilities do not have any experience of the new regulatory set-up and would need assistance by way of specialized expertise to help them in the formation of tariffs, complying with the information requirements, and

presenting their case to the regulatory commission. Has this issue been given adequate attention and is sufficient assistance available with the regulated utilities?

- With the initiation of the reform programme, it is important that different components of the tariff structure are separated and information made available to the consumers and potential investors. This process will ensure that the envisaged divisionalization and corporatization of the SEBs take place and will facilitate the introduction of competition and private participation in the sector. Are the SEBs in a position to unbundle their tariff structure and prepare accounts on that basis? Do metering arrangements for such an arrangement exist? How fast can these be developed?
- Is it possible, given the current state of development and information level, to a have performance-based rate structure? What are the possible performance indicators that can be considered?
- Administrative procedures have a potential to create delays and undermine the regulatory decisions. How can these be minimized while ensuring that transparency of the process and the opportunities for judicial review are not compromised?
- Under Schedule VI of the Electricity (Supply) Act, 1948 the licensees are allowed to earn a return of five per cent over the prevailing RBI bank rate at the beginning of the financial year. This provision where the return available varies from year to year has led to uncertainty in the investor community. Also if the return available to the generating companies is assured at 16%, by same rationale, should not the return to T&D companies be at least at the same level?

Issues for Session 4: Present and future strategies

- What are the lessons from Orissa and how can one ensure that the mistakes are not repeated?
- What should be the pace of reforms?
- What should be the strategy to deal with stranded costs and grandfathering effects of past contracts?
- How should new PPAs be structured to promote competition and economy in operation?
- What are the issues related to transmission system planning and pricing in the changing sectoral scenario?
- How should employee-related issues be handled?
- Training and upgrading of skills at the SEBs is vital to ensure that the people do not lose motivation and are not made redundant by the new environment. How will this be ensured given the fact that SEBs have no money?

Legal Consultant,
New Delhi

M G Ramachandran

Regulatory reform in the state electricity sector

Transition to a liberalized environment: experiences and issues in regulation 99-103

Power sector reform – is legislation necessary?

Reform in the state electricity sector cannot be achieved by an executive action of the government or the SEB (state electricity board). Legislation duly enacted by the Parliament or the state legislature is a necessity. The reasons for this are detailed below.

Electricity is a concurrent subject specified in List III of the seventh schedule to the Constitution of India. This means that both the Parliament and the state legislatures have the authority to legislate on the subject, but a Central Act shall prevail over a State Act in case of any inconsistency, except where the State Act has got the specific assent of the President of India. The Electricity (Supply) Act, 1948 is a Central Act. Section 5 of this Act provides that every state shall have an electricity board and Section 18 lays down the functions and duties to be performed by the electricity board. The states are bound by the above mandate. The restructuring of the SEB, i.e., unbundling and corporatization is not possible except by enacting a State Act and getting the specific assent of the President for the State Act in terms of Article 254 of the Constitution.

The constitution of an independent regulatory commission is one of the most essential aspects of reform. To ensure proper autonomy to its functions and to protect the members from government or executive influence, the regulatory commission should be a statutory body, set up under a legislation and not by an executive order by the government. The commission has to be given various powers to regulate the working of the utilities including the power to grant licences, revoke or amend the licences, set standards of performance, and take action for defaults or failures. These powers are required to be conferred under the statute so that the commission has the legislative backing to discharge its functions.

Reform involves restructuring of the SEB, unbundling various functions of the SEB, corporatization of the functions in one or more corporation, transfer of assets, liabilities, and personnel from the SEB to corporation(s), and various other matters which may be open to challenge by different sections of the society. The restructuring should have legislative sanction to meet such challenges. A legislative action is generally not open to challenge on grounds of mala fide and similar other grounds whereas an executive action is.

Legislation carries with it the backing of the elected representative and, therefore, public support. An executive action is only an administrative act on the part of the government machinery. A legislative action is less interfered with even when there is a change in the government, whereas the executive actions can be undone easily by successive governments or even by the same government quite often.

The confidence of the public at large, the investors, and others will be more if the reform has legislative backing as compared to an executive act.

Constitution of the state electricity regulatory commission

Section 17 of the Electricity Regulatory Commissions Act, 1998 passed by the Parliament empowers the state government, by notification in the official gazette, to establish an SERC (state electricity regulatory commission). If the state government decides to establish an SERC, the commission shall be a body corporate consisting of three members including the chairperson.

Subsection (1) of Section 22 provides that the SERC shall discharge the functions of determination of the tariff for electricity (wholesale, bulk, grid, and retail) and also for the use of transmission facility. The SERC will also regulate the power purchase and procurement process.

Subsection (2) of Section 22 empowers the state government by notification to confer further functions on the SERC as specified in the subsection. These include power to the SERC to regulate investments, issue licences for transmission, bulk supply, distribution, or retail supply, regulate the working of the licensees, set standards for the electricity industry in the state, etc.

The provisions of the Electricity Regulatory Commissions Act, 1998 in regard to the SERC read as a whole lead to the following conclusions.

- It is not mandatory for the state government to establish an SERC; it is optional.
- If the state government decides to establish the SERC, it is mandatory that the SERC consist not more than three members and the members are selected in a manner prescribed under Section 18.
- If the state government decides to establish the SERC, it is mandatory that the state commission should have the functions of determination of tariff both for supply and

transmission of electricity, including wholesale, bulk, grid, or retail supply and also the power to regulate power purchase and procurement process. It is, however, not mandatory that the SERC should be given other powers.

- The state government may decide to give such of the other powers as specified in subsection (2) of Section 22.

In view of this, if the state government exercises the option to establish an SERC by notification under the above Act, the state government will equally have the power to withdraw the notification and abandon the SERC at any time. In other words, the state government can by an executive order of publishing a notification in the official gazette withdraw the powers of the commission. This strikes at the root of the necessity to establish an independent regulatory commission. The state government as an executive can at its discretion interfere with the working of the regulatory commission.

Section 39 of the above Act provides as under.

> *In the discharge of its functions, the State Commission shall be guided by such directions in matters of policy involving public interest as the State Government may give to it in writing.*
>
> *If any question arises as to whether any such direction relates to a matter of policy involving public interest, the decision of the State Government thereon shall be final.*

The power under Section 39 to give directions also makes a serious inroad in the independence of the regulatory commission. The state government can give directions as policy directives and if there is a dispute about the direction, the decision of the state government shall be final.

These are two important factors that show the establishment of the SERC under the Electricity Regulatory Commissions Act, 1998 will not be a satisfactory measure as it affects the very independence of the regulatory commission. The duration for which the SERC may exist also becomes precarious. If the working of the SERC is not to the liking of the state government, the state government may dissolve the state commission. Any change in the political leadership may also lead to dissolution of the SERC or curtailing of its powers.

The power sector reform requires the setting up of a regulatory commission with proper independence from the state government and its continued existence without interference. The state government should be distanced from the regulatory aspects as well as from the working of the utilities. Unfortunately, the Electricity Regulatory Commissions Act, 1998 (which provides for an option to the state government in regard to the SERC and also gives power to the state government to issue directions) completely erodes such independence required for proper functioning of the commission.

In addition to the above, the Central Act does not enable the restructuring of electricity industry in the states. If the electricity industry is not restructured many of the provisions of Section 22 cannot be implemented effectively. In terms of the provisions of the Indian Electricity Act, 1910 and the Electricity (Supply) Act, 1948, the SEB is not a licensee. The issue will arise whether the SERC can exercise the power to regulate the working of the SEB.

If the SERC constituted under the Central Act cannot be conferred the power to regulate the SEB, the power to determine tariff only (without a corresponding power to regulate) will not be a complete power. The effective determination of tariff should include the power to regulate the working of the utilities and provide the incentives, penalties, etc., based on the performance/non-performance.

Even if under the notification issued by the state government under the Central Act, the SEB can be legally brought under the regulatory control of the SERC, extensive amendments of the Electricity (Supply) Act, 1948 will be necessary. This will mean interpretation of the following four pieces of legislation/subsidiary legislation.

1 Indian Electricity Act, 1910
2 Electricity (Supply) Act, 1948
3 Electricity Regulatory Commissions Act, 1998
4 Notification to be issued by the state government under sub clause (2) of Clause 22 of the Central Ordinance

The conflicts between the above four have to be resolved including the questions as to how far a notification issued under the Central Act supersedes the provisions of the Electricity (Supply) Act, 1948. The differences may involve the implementation of the provisions in a long-drawn litigation and defeat the whole purpose.

The state cannot deviate from the provisions of the above Act and will have to accept the provisions of the Act in total if the SERC is established under the above Act.

Besides other considerations, it is important that the state government should take the initiative and own up the reform. Establishing the SERC under the Central Act will be taken as if the state government is following the dictates of the central government. If the reform has to succeed, the state legislature should have the pride of moving the reform. What is important is not the wording of the sections and expressions used, but a clear intent to reform. This intent is best manifested when the state government proposes the bill, discusses it in the state legislature, and passes it by the requisite majority in the house.

Orissa Electricity Regulatory Commission, Bhubaneswar

D K Roy

Basic issues of regulation in the Indian power sector

Transition to a liberalized environment: experiences and issues in regulation 104-113

Power sector restructuring has received enormous attention during the last three years. The formation of an independent regulatory commission has been the cornerstone of the restructuring exercise. Despite the resistance of political groups, bureaucracy, and various sectors of society to any institutional change, there has been remarkable progress in the establishment of electricity regulatory commissions. Orissa took the lead in establishing a commission on 1 August 1996, and was followed recently by the setting up of the CERC (Central Electricity Regulatory Commission) and the Haryana Electricity Regulatory Commission. Before the end of 1998/99, the Government of India expects to have nearly 10 state commissions in place.

The establishment of an independent regulatory commission, functional unbundling, and the break-up of vertically-integrated SEBs (state electricity boards) have been at the core of the reform programme. The terminal illness of the SEBs has precipitated the need for urgent reform to rebuild the electricity industry which can be efficient, attract private capital, protect consumers, and advance the goals of public policy. The government, not in a position to provide funds, has decided to explore avenues for participation of private sector entrepreneurs in the electricity industry. While faced with the failure to provide funds and sustain the utility, the government cannot simply withdraw from ownership and management and leave the industry to the vagaries of the market. Instead, it is obliged to make alternative arrangements to maintain an improved system, to meet the growing demand of electricity, and to provide safe, reliable, and economic power supply. It is, however, difficult to develop a regulatory framework that is capable of providing both stability and responsiveness to changing circumstances. An appropriate regulatory framework depends on what purposes are sought to be achieved and how much change can be effected in a given situation. The government needs to be sensitive about things that can go wrong with the process. It can lose sight of the difference between form and substance. The government needs to have a clear perception of the goals of reform and accordingly design a regulatory framework which can achieve these goals while providing adequate support for the restructuring and reorientation of the utility during the transitional period. In the Indian context, the goals may be exemplified with reference to the OERC (Orissa Electricity Regulatory Commission) as this is characteristic of the reform perspective in the states and the centre.

The objectives as incorporated in the preamble of the Orissa Electricity Reform Act, 1995 are as follows.

> *An Act to provide for the restructuring of the electricity industry for the rationalization of the generation, transmission, distribution and supply of electricity. For avenues for participation of private sector entrepreneurs in the electricity industry and generally for taking measures conducive to the development and management of the electricity industry in the state in an efficient, economic and competitive manner including the constitution of an Electricity Regulatory Commission for the state and for matters connected therewith or incidental thereto.*

The objectives in the Electricity Regulatory Commissions Act, 1998 are as follows.

> *An Act to provide for the establishment of a Central Electricity Regulatory Commission and State Electricity Regulatory Commissions, rationalization of electricity tariff, transparent policies regarding subsidies, promotion of efficient and environmentally benign policies and matters connected therewith or incidental thereto.*

There is a need to look behind the stated objectives to understand that the main rationale for reform is to address serious financial problems, technical inefficiencies, and looming power shortages. It is of interest to note the difference in the objectives and functions as incorporated in the Orissa Act and the Central Act. The Orissa Act explicitly provides for restructuring of the electricity industry. The Central Act is silent on this aspect and focuses on rationalization of tariff. While the Central Act does not expressly envisage restructuring of the industry, the Orissa Act is silent on environmental commitments. Further, the Orissa Act provides for limited commitment with regard to 'the interest of consumers' as this stipulation occurs (Section 26[2] of the Act) only with regard to the determination of tariff, whereas the state commissions under the Central Act may be mandated to ensure a fair deal to the customers while promoting competitiveness and making avenues for participation of the private sector in the electricity industry (vide Section 22[2][b] of the Act).

Obfuscation in spelling out the goals results in the ambivalent attitude of government functionaries who write the rules of the game and who are supposed to provide the support and facilitation for the new institution to take root and function in a meaningful way. Lack of clear and unambiguous objectives leaves much scope for the commissions to have their own interpretation of the aims and objectives.

The commission can be viewed differently by different authorities and interest groups, and the regulatory framework can vary from state to state on important issues. The decisions of the commission can cause frequent litigation if the objectives and functions are not clearly spelt out. The Government of India may look to the commissions only for fixing cost-based tariff without political and social pressures. The World Bank and the consultants may tend to view regulation only as an economic and technical question, and the state government may view it merely as an unavoidable institution to attract funds from the World Bank, other multilateral funding agencies, and private investors. The government has genuine difficulty in selling a comprehensive reform programme to the people who have long been used to state funding and state assistance for provision of essential services and public goods, including electricity. Hence, it is understandable that restructuring and privatization needs are to be understated in the reform programme. But as indicated earlier, unclear objectives are likely to result in designing an inappropriate regulation.

Having taken steps in the right direction for a liberalized and pragmatic policy in the best interests of economic development and the public, the government has to build a legally good, morally enforceable, and independent regulatory framework that ensures public accountability and rational decision-making. Regulation obviously cannot be just an economic and technical question, it is a political and social issue as well. Any regulatory framework which does not take into account the impact of its interface with the political executives, the civil service, the operators in the government and private sectors, the employees of the SEBs and government companies, and the various sectors of consumers, will be unable to function smoothly and achieve its objectives. The choice of market structure in a reformed power sector must reflect current technical, political, and social realities as well as long-term aspirations of the industry.

The National Economic Research Associates has identified a comprehensive set of criteria, outlined below, against which the restructuring model may be measured.

- Commercial viability
- Financial viability
- Efficiency
- Optimization of the system
- Operational feasibility
- Legal feasibility
- Reduction in corruption
- Consumer protection
- Acceptability to stakeholders

This set of criteria is equally applicable in Orissa and Haryana, and is also likely to be suitable for other states.

It is necessary to emphasize that restructuring is a unique experience. The model of one country cannot be routinely replicated in another. The temptation to heavily depend on international experiences, particularly those of the US and the UK, should be avoided in restructuring and regulation even though the best practices of these countries may be adopted. Many talk glibly of deregulation, customer choice, and unbundling of distribution and supply in the light of experiments in the UK and the US. This may be inappropriate in the context of the current social, economic, and industrial situation in India.

The industry is swinging between stable state ownership and complete laissez-faire, pointing to the need for the creation of a regulatory equilibrium. The command and control regime of state ownership obviously provides imperfect regulation where rates are set by the government with disastrous consequences on the industry. It will be even more disastrous to go to the other extreme of an imperfect market. The US which has been enjoying/experiencing regulatory equilibrium for decades is now witnessing a movement to the right. We cannot afford to rely on current US experience and experiment with it in the Indian context. Competition acts as a force for innovation, productivity, and progress. It is not, however, the objective in itself. The objective is finding the most effective route to the desired result – an equitable society, more efficient allocation of economic resources, and a more productive Indian electrical system. At this point of economic history in India, our limited objective should be to arrive at a regulatory equilibrium.

As the electricity industry in India has to be transformed to take advantage of globalization in terms of technology, funds, and competition, the regulatory commissions will have to play a crucial role and be designed and equipped accordingly. The legislation should provide for the establishment of the commission, mechanism of tariff fixation, supervision and control of quality of service, method and manner of enforcement of obligation of utilities, and dispute resolution mechanism. As observed by T L Sankar, Principal, Administrative Staff College of India, it is advisable to carry out the restructuring with an authorization under a legislation so that the challenge to various aspects of restructuring is minimized.

Tariff is only the tip of the iceberg and hence a commission entrusted only with tariff fixation will be unable to achieve the goals of transforming the industry to an economic and efficient entity. The commission must have the powers to issue licences and monitor performance in all aspects, albeit in a hands-off and quasi-judicial manner. While the OERC has been given significant powers, some states plan to entrust the commission with the task of tariff fixation only, with the licensing power to be given at the discretion of the state government. This half-hearted approach to reform is not likely to succeed. To quote Bernard Tenebaum, formerly of the US Federal Energy Regulatory Commission, 'Power sector reform will succeed only when governments reform both the sector and the way it is regulated.' He lists the following as the prime responsibilities of the electricity regulator.

- Issue and enforce licences and concessions
- Set prices when there is no competition
- Monitor financial viability of operators
- Set service standards and monitor compliance
- Arbitrate disputes between operators
- Arbitrate disputes between operators and consumers
- Provide information and advice to the ministry

The regulatory commission is expected to usher in a totally new era in form and content of the electricity industry. For that to happen, the commission has to be perceived as independent of the government machinery and designed with the principle of good governance. Further, the four key principles of good governance criteria as identified by the Asian Development Bank, namely accountability, transparency, predictability, and participation, may be adopted for designing the regulatory framework.

The foremost criterion for the credibility of the commission is autonomy from governmental control and supervision.

This has been accepted in principle but there are deeply entrenched vested interests, archaic rules, and lack of understanding and commitment in the governmental machinery which, unless tackled, will erode the credibility of the commission and hamper it from acting without fear and favour. The selection process of the commissioners, the terms of appointment, and their accountability, etc., have been more or less taken into account in the laws passed so far. But one or two soft points may be dealt with here. In the CERC, the CEA (Central Electricity Authority) chairman, who is a part of the government, has been included as an ex officio member. In the Rajasthan Bill, the commissioner's term is three years with eligibility for reappointment. This is likely to impinge on the objectivity of the members as there may be temptation to ingratiate the government or conversely, hesitation to take a decision unpalatable to the government.

While governments have the power to issue policy directives, the law must specify that such policy directives must be consistent with the aims, objectives, and provisions of the Act. Disputes between the government and the commission are referable to the CERC in case of the Karnataka Bill, and retired judges in case of the Rajasthan and Andhra Pradesh Bills. Such a provision is apparently an improvement on the Orissa Act.

Important issues affecting the independence of the commission are funding, staffing, accounting, and administrative interface with the state government. Merely providing for the expenditure to be charged to the consolidated fund of the state does not confer financial autonomy. This only precludes legislators from voting on the budget of the commission. But the control of the administrative ministry and finance department of the state government may seriously affect the autonomy and efficiency of the commission. It needs no emphasis that the government can effectively control the commission through allotment of funds, issue of sanction orders, procedures for spending, drawing of bills, accounting and auditing, etc. The commission should be given the autonomy to adopt its own procedure for expenditure, accounting, and audit within the overall funds allotted to it for the year. It should be directly accountable to the Accountant General in financial discipline and not be fettered by executive interference once the funds are allotted.

Transparency has to be the hallmark of regulatory procedure and decision-making. The methodology adopted by the OERC consists of the following.

- Elaborate regulations have been notified on conduct of its business proceedings.

- Hearings are open to all.
- Proceeding on important issues such as licence, tariff fixation, tariff amendments, etc., are advertised in newspapers.
- Decisions are taken collectively by the three commissioners.
- Access is allowed to all interested persons to the procedures, orders, decisions, and policies.

Accountability holds public officials responsible for delivering particular outputs. The measures adopted by the OERC for its own accountability are as follows.

- All orders are passed in writing with elaborate reasoning.
- Certified copies of orders are issued to enable affected parties to file appeals in the high court.
- An annual report of activities is submitted to the government for placing in the legislature.

The regulatory commission can be effective and acceptable only by enlisting participation of stakeholders and the public. Steps taken by the OERC in this direction are as follows.

- A CAC (Central Advisory Committee) with representation from all sectors of stakeholders including those from industry, consumers' representatives, and employees of utilities has been formed.
- The CAC meets once in three months with the agenda circulated in advance.
- The CAC is consulted on important issues such as fixation of tariff, consumer service, and performance standards.
- Consultation papers are issued and views solicited on important issues such as tariff.
- In the formal hearings, intervention and participation is allowed to interested parties.
- Seminars, meetings, and informal hearings are held to obtain views of stakeholders and professionals.

The element of predictability emerges out of stable, open, and well-understood rules, where policies and procedures are transparent and accountable. In Orissa, this predictability came about through explicit design – issue of standards, practice directions, and guidelines.

Tariff regulation is the most crucial instrument in the hands of regulators. The regulatory framework has to incorporate a tariff formula which meets with the pricing objectives of the regulation. The basic models are rate base / rate of return which is the most widely prevalent, performance-based or incentive which has been adopted in the US in recent years, and price cap which has been adopted in the UK. But regulators also adopt a mixed formula or an ad hoc method. Each formula has its advantages as well as drawbacks. Investors want certainty and high profits. The government wants the utility to aid the expansion of economy, and also wants it to charge the lowest price possible. Customers want the best possible service for the lowest possible price. The regulator has to balance these pressures mainly through tariff regulation.

Under the Electricity (Supply) Act, 1948, the licensees were obliged to determine the tariff for supply strictly in accordance with the Sixth Schedule which provided that the charges for sale of electricity should be so determined that clear profit shall not exceed the amount of reasonable return which was pegged approximately at five per cent over the bank rate. The Sixth Schedule gives a precise and elaborate method of calculating capital cost, clear profit, and reasonable return. The Orissa Act authorizes the commission to depart from any of the factors specified in the Sixth Schedule. The Central Act stipulates that the Sixth Schedule shall be one of the factors to guide the state commission in fixing tariff for supply of electricity.

The rate of return formula ingrained in the Sixth Schedule assures a reasonable return to investors and hence is comforting to them. But the formula as such cannot be acceptable to consumers as it does not give a guarantee even for a basic level of service. If the formula is applied without any conditionality, the cost of inefficiency has to be passed on to the consumers; efficient operators can have no incentive; and special appropriation provision has been kept in the discretionary realm.

In keeping with the reform agenda, the Sixth Schedule or any mechanical formula is no more mandatory. The rate of return calculation can only be a benchmark for the regulators to determine tariff. It is necessary to adopt a mixed approach combining the features from the rate of return, price cap, and performance-based mechanism. The OERC has adopted the mixed approach of combining targeted incentives with the rate of return regulation. In the regulatory design adopted by the OERC, tariff has been determined within the rate of return bandwidth to motivate the licensee to reduce cost, improve consumer service, and reduce transmission and distribution losses. It appears that though the commission has not been able to provide an incentive due to the absence of adequate profit, it has given enough of a signal in this direction. The tariff guideline for the state commissions as incorporated in Section 29(c) of the Electricity Regulatory Commissions Act, 1998 includes the desirable factors such as tariff reflecting cost of supply, improving level of efficiency, economic use of resources, etc.

Flexibility provided to the commissions in the reform legislation of the centre and the states in tariff determination will enable them to evolve appropriate tariff design for the licence in a pragmatic manner balancing the interests of all stakeholders. As the commission will have to function with independence and transparency, the investors should have no apprehension. The OERC has enhanced transparency by wide consultation and the issuance of a tariff policy paper to deal with issues that were raised by various stakeholders and professionals. The policy paper is to be revised at reasonable intervals. In the restructured and reformed environment, regulation should focus on process and quality of decision-making rather than on mechanical application of formulas. Regardless of which criterion is selected, what is really important is that the rate system should be based on technical concepts to make it impervious to political manipulation. Prices can be based on marginal costs or standard costs. In Chile, the choice was marginal costs for generation, standard costs for distribution, and a mix of marginal and standard costs for transmission wheeling charges. The regulator in India has to adopt an appropriate pricing mechanism.

It is considered relevant to deal with two important issues that will have considerable impact on implementation of tariff regulation.

The first is the commitment, objectivity, and professional competence of the regulators. Proper selection, desirable terms of appointment, proper orientation, and training for regulatory commissioners need more than a routine approach due to three main reasons.

1. Absence of similar institutions and relevant precedents
2. Inbuilt resistance of the bureaucracy to part with discretionary powers in favour of regulators
3. Likely indifference of state governments to provide adequate support and autonomy to regulators

The other issue is 'subsidy'. To quote David Matin Roodman from his treatise *The Natural Wealth of Nations*

> *Few public policies are as unpopular in theory and popular in practice as subsidies. The very word can make economists shudder and tax payers fume, turn the poor into cynics and enrage environmentalists.*

Subsidies have been an integral part of tariff setting in the electricity sector. Reforms cannot wish away this element. During the transitional period, till the government-owned utilities are able to realize cost and reasonable returns, the government will have to provide subsidies for the poor; specific sectors in keeping with the financial, industrial, and agricultural policies; and other public purposes such as maintenance and extension of electricity in rural areas. The commission is required to set tariffs for various categories, mainly on cost of supply. While doing so, it may be expected to accommodate some cross-subsidy as long as it does not impinge on equity and undue discrimination. But if any particular category of consumers has to be charged less than the cost of supply due to public policy considerations, the state must provide funds to the service provider if it cannot adopt the more economically desirable method of giving direct subsidy to the targeted consumer group. If the state does not make the funds available on time, the credibility of the regulatory commission will be eroded and the utility's financial health would be adversely affected. It will be necessary to phase out subsidy in a gradual manner. An unambiguous approach by the state with regard to subsidy is essential for purposeful tariff regulation.

While an appropriate regulatory framework can be crafted by taking into account the key factors indicated above, the success of regulators in achieving the objectives of public policy will depend on genuine support from the government, quality of decisions of the regulators, and public awareness.

Federal Energy Regulatory Commission, Washington, DC, USA

Linda K Breathitt

Evolution of energy regulation in the United States

Transition to a liberalized environment: experiences and issues in regulation 114-120

Introduction

An understanding and study of international energy regulatory issues is important in view of the convergence of global energy markets and multinational business transactions. As India proceeds with the introduction of independent regulation of its energy industries, the sharing of information between nations becomes particularly meaningful.

As in India, the regulation of energy industries in the United States is undergoing profound changes. These changes can be characterized primarily by the restructuring of electric and natural gas utilities and the emergence of competition in the bulk power and gas transportation markets.

The Federal Energy Regulatory Commission

In the US, FERC (Federal Energy Regulatory Commission) is an independent regulatory agency that (1) regulates the transmission and sale for resale of natural gas in interstate commerce; (2) regulates the transmission of oil by pipeline in interstate commerce; (3) regulates the transmission and wholesale sales of electricity in interstate commerce; (4) licenses and inspects private, municipal, and state hydroelectric projects; (5) oversees related environmental matters; and (6) administers accounting and financial reporting regulations of jurisdictional companies.

FERC was created by the Department of Energy Organization Act on 1 October 1977 to replace the Federal Power Commission, which had operated since the 1930s. FERC comprises five commissioners who serve staggered five-year terms. Commissioners are appointed by the president and confirmed by the US Senate. No more than three commissioners belong to the same political party. The president designates one of the commissioners as the chairman, who serves as the commission's administrative head. Each commissioner, including the chairman, has one vote on all regulatory matters before the commission. A simple majority of three commissioners is necessary for a decision by the commission.

Most of the commission's legal authority comes from the Federal Power Act of 1935, the Natural Gas Act of 1938, the Natural Gas Policy Act of 1978, the Public Utility Regulatory Policies Act of 1978, and the Interstate Commerce Act.

Developments in the electric industry

Electric utilities have been regulated by federal and state governments since the early 1930s, when legislation was enacted to end the abuse of large, powerful trusts which controlled the nation's electric distribution networks. In 1935, the Congress enacted the PUHCA (Public Utility Holding Company Act) and the Federal Power Act, which among other things, empowered the federal government to regulate the transmission of electric energy in interstate commerce and wholesale sale of electric energy.

As a result of the Federal Power Act and the PUHCA, electric utilities became self-sufficient, vertically-integrated companies that owned and controlled their own generation, transmission, and distribution systems. Since then, the activities of these electric utilities have been carefully regulated by state and federal governments.

Throughout the 1950s and 1960s, the electric utility industry operated efficiently and productively as a regulated monopoly. This was because electric utilities enjoyed a relatively stable operating environment characterized by declining operating and production costs and increasing profits, significant technological improvements, and steady fuel prices. Customer demand for electricity increased at a steady rate resulting in the construction of new power plants at an unprecedented rate, spurred in part by low capital costs and a favourable regulatory environment.

However, all this changed dramatically in 1973, when the Arab oil-producing nations imposed a ban on oil exports to the US. Oil prices increased significantly, followed soon by higher prices for natural gas and coal. The high prices for these fuels caused electricity rates for consumers to rise abruptly. Between 1970 and 1985, the average residential electricity prices increased by 25% and rates for industrial customers increased by 86%, after adjusting for inflation. Demand for electricity plummeted and public concerns and awareness of energy issues increased. This permanent shift in the electric industry set the stage for a gradual move towards a more competitive market for electricity.

These circumstances served as a catalyst for the adoption of the National Energy Act of 1978 by the Congress. The Act was intended to reduce the nation's dependence on foreign oil and its vulnerability to interruptions in energy supply, and develop renewable and alternative energy sources.

The centrepiece of the National Energy Act was PURPA (Public Utility Regulatory Policies Act). PURPA was designed to encourage the efficient use of fossil fuels in electric power generation and the use of renewable resources through small power producers.

As a further step towards a competitive electricity generation market, the Congress passed EPACT or the Energy Policy Act of 1992, which substantially reformed the PUHCA and made it easier for non-utility generators to enter the wholesale energy market. EPACT also created a new type of power producers called EWGs (exempt wholesale generators). The new law facilitated the entry of EWGs into the electricity market by exempting them from many constraints and restrictions. The law also gave the FERC the authority to order utilities to provide EWGs access to the utilities' transmission system.

In April 1996, there was a move towards a competitive wholesale power market, when the FERC issued major rule-makings known as Order No. 888 and Order No. 889. These important and far-reaching rules are intended to remove impediments to competition in the wholesale bulk power market and bring more efficient and lower cost power to customers. FERC required all public utilities that own, control, or operate facilities used for transmitting electric energy in interstate commerce to file non-discriminatory open-access transmission tariffs containing minimum terms and conditions of transmission service. Furthermore, Order No. 888 required utilities to separate their generation and wholesale power merchant functions from their transmission function. This is known as 'functional unbundling'. The commission took these steps to remedy undue discrimination in access to the transmission grid to remove impediments to competition in the wholesale bulk power market and to bring more efficient and lower cost power to customers.

FERC has recognized that consumers are demanding access to lower cost supplies and to newer, lower cost generation resources from non-utility generators and that customers should have the benefits of competitively-priced generation. FERC's recent rule-makings have given non-traditional suppliers and generators of electricity access to the transmission grid on a non-discriminatory open access basis. This has opened the way for a competitive wholesale bulk power market at the national level and competitive retail electricity markets in many individual states.

In Order No. 888, FERC stated that if functional unbundling becomes inadequate in assuring non-discriminatory open access, it would decide whether other mechanisms should be required. One such mechanism would be the implementation of ISO (independent system operators) or other types of RTOs (regional transmission organizations). The RTOs, including ISOs, are independent companies that would operate electric transmission networks so as to allow open and equal access to all electricity buyers and sellers. The RTOs will perform duties that have traditionally been performed by utilities and will be responsible for system reliability and security. Other functions of the RTO will include managing transmission congestion, administering transmission and ancillary pricing, and making information about transmission publicly available.

The commission has identified three different types of RTOs. These include non-profit ISOs and for-profit transmission companies called 'transcos' or 'gridcos'. Transcos are independent, for-profit organizations that own and operate a regional transmission grid. Gridcos are independent, for-profit organizations that own, but do not operate, a regional transmission grid. The ISOs operate, but do not own, a regional transmission grid.

FERC also recognized (in Order No. 888) the importance of fair and non-discriminatory access to transmission services. The commission stated in the order that 'ISOs have great potential to assist us and the industry to help provide regional efficiencies, to facilitate economically efficient pricing, and, especially in the context of power pools, to remedy undue discrimination and mitigate market power'. However, it was stressed that US policies regarding ISOs would be developed over time and such an investigation is going on. In late 1998, the commission initiated a proceeding to develop a proposed rule-making on RTOs. In this proceeding, the commission will consider whether the goals of full competition and non-discriminatory access can be achieved in the absence of broad participation by transmission-owning electric utilities in RTOs.

Instituting RTOs should prove to be a complicated endeavour for the commission. It is absolutely crucial to handle this issue with extreme care and consideration. The transmission system that exists in the US today was never intended to be an efficient and coordinated nationwide grid. It was built over many decades by many individual electric utilities, both public and private, for the sole purpose of serving the needs of their specific customers. To make their transmission systems more secure and reliable, the utilities established a limited number of interconnections with neighbouring utilities. These interconnections were not built for the purpose of widespread commerce of electricity, but for sharing economic and emergency power among non-competing utility systems. The US is now trying to turn the present fragmented and territorial transmission systems into a single, efficient, inter-regional transmission grid, which will, obviously, not be a simple task.

In Order No. 888, FERC states the importance of regional grid management by establishing 11 guiding principles to assist in the formation of ISOs. These principles will possibly be used by the commission in evaluating all regional transmission organizations, not just ISOs.

1 The ISO's governance should be structured in a fair and non-discriminatory manner.
2 An ISO and its employees should have no financial interest in the economic performance of any power market participant. An ISO should adopt and enforce strict conflict-of-interest standards.
3 An ISO should provide open access to the transmission system and all services under its control at 'non-pancaked' rates pursuant to a single, unbundled, grid-wide tariff that is applicable to all eligible users in a non-discriminatory manner.
4 An ISO should have the primary responsibility of ensuring short-term reliability of grid operations. Its role in this responsibility should be well-defined and comply with applicable standards set by the North American Electric Reliability Council and the regional reliability councils.
5 An ISO should have control over the operation of interconnected transmission facilities within its region.
6 An ISO should identify constraints on the system and be able to take operational actions to relieve those constraints within the trading rules established by the governing body. These rules should promote efficient trading.
7 The ISO should have appropriate incentives for efficient management and administration and should procure services needed for such management and administration in an open and competitive market.
8 An ISO's pricing policies for transmission and ancillary services should promote efficient use and investment in generation, transmission, and consumption. An ISO or a regional transmission group of which the ISO is a member should conduct such studies as may be necessary to identify operational problems or appropriate expansions.
9 An ISO should make information regarding transmission systems publicly available on a timely basis via an

electronic information network consistent with the commission's requirements.

10 An ISO should develop mechanisms to coordinate with neighbouring control areas.

11 An ISO should establish an alternative dispute resolution process to resolve disputes in the first instance.

The commission established these principles, in part, to give the electric industry some guidance on the formation of ISOs. The ISO's operating standards and procedures must be approved by the commission as it will be a public utility, subject to the jurisdiction of FERC. To date, the commission has approved five ISOs throughout the US. These include (1) the Pennsylvania–New Jersey–Maryland Interconnection, (2) the California ISO, (3) the New England ISO, (4) the New York ISO, and (5) the Midwest ISO. There have also been reports from industry participants that negotiations are under way in several regions of the country for the formation of independent transmission companies or transcos.

This year, the commission will carefully consider all advice and suggestions from the electric utility industry, electric market participants, state utility commissions, and others. This will help resolve many issues including (1) whether the commission should consider dividing the country into regional districts for the development of independent RTOs; (2) what the most important purposes for having an RTO are; (3) whether there are minimum characteristics that an RTO must have and functions that an RTO must perform to attain real benefits; and (4) what the appropriate role of state commissions should be in the formation, governance, and regulation of RTOs.

The most important event of the commission's fact-finding process will take place when the first of several consultation meetings with state regulatory commissioners are held. The purpose of these meetings will be to hear the views of the state commissions on the need for RTOs, the role of the states in RTO formation, and the criteria for establishing geographic boundaries for RTOs. This consultation process between federal and state regulators is a very important part of the overall process in the US.

Federal and state regulators in the US have very distinct roles and jurisdictions. However, the fact that the federal and state regulators are regulating the same industries makes it extremely important that they cooperate with one another to the extent practical. This cooperation is more important now than it has ever been. As restructuring of the electric industry is taking place, utilities and other market participants need to know which regulator has jurisdiction over which facilities and services in order to meet state and federal regulations and filing requirements. Historically, state commissions have had jurisdiction over the siting and certification of electric transmission, distribution, and generation facilities. State commissions also regulate utility services and establish rates for end-use retail customers. FERC, on the other hand, regulates transmission and wholesale sales in interstate commerce. The FERC establishes wholesale rates that utilities can charge each other and other participants in the wholesale electric market for bulk power sales.

Cooperation and coordination is important between the utility and the federal regulators. When the lines between federal and state jurisdiction become blurred, as they often do, such cooperation should, in most instances, facilitate the resolution of these conflicts.

Conclusion

The electric industry in the US has proceeded from a tightly regulated monopoly structure to one with more reliance on competitive market forces. This evolution has been challenging for energy regulators and the industry alike. However, these developments are still in full play and, in the foreseeable future, FERC will be spending much time and effort on defining the path energy that utilities in the US will take.

The new regulatory effort currently under way in India will initially be on a somewhat undefined path. But the rewards will most likely be in the form of efficient and competitive energy industries and markets and energy consumers receiving reliable and reasonably priced energy services.

BSES Limited,
Mumbai

R V Shahi

Transition to a liberalized environment: regulation and market structure

Transition to a liberalized environment: experiences and issues in regulation 121–127

---

troduction

The liberalization initiatives of the Government of India in 1991 marked a shift from reliance on government investments to dependence on the private sector in various areas of economic and industrial activity. In step with this, policy pronouncements were made inviting the private sector into the field of power generation. Correspondingly, government support for the development and expansion of the power generation capacity reduced substantially.

To analyse the various issues that the industry faces during the period of transition to a liberalized environment, it would be necessary to understand (1) the structure and dynamics of interplay of various constituents of the sector prior to liberalization, (2) present status, and (3) the objectives.

The following provides a brief outline of the important characteristics of the structure as it prevailed prior to the initiatives of liberalization. To a great extent, it remains the same even now.

- More than 95% of the industry was controlled by organizations in the government sector. The role of the private/ professional sector in the industry was limited to about five per cent in generation and about three per cent in distribution and supply.
- Even within the government sector, about 25% of the generation aspect of the industry was under the control of the corporate sector and the rest under the aegis of the SEBs (state electricity boards). The distribution side of the industry within the government sector has been totally under the control of the SEBs.
- Barring the fixation of tariff for generation facilities under central government control, tariff fixation in the SEBs for the distribution of electricity was invariably a political decision. As a result, consumer tariff was substantially subsidized and cross-subsidized by other sectors of consumers; in aggregate, the entire supply continues to remain subsidized. Most SEBs are unable to earn even the minimum three per cent return they are expected to.

- In so far as the regulatory mechanism is concerned, state energy departments together with the SEBs were in control of consumer tariff. For generation companies owned by the central government, the CEA (Central Electricity Authority) and the central government have functioned as the regulatory institutions.
- The CEA functioned over the years as a regulatory institution for many other issues such as sanction of new capacities and new transmission lines, forecasting of demand, power systems studies, etc. The Indian Electricity Act, 1910 and the Indian Electricity (Supply) Act, 1948 provide the statutory framework for development and regulation in the industry.

Limitations of the present market structure

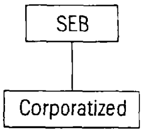
The above framework has been in existence for the last 50 years. Though the industry has expanded from about 1500 MW to about 90 000 MW of generation capacity, the system still suffers from substantial shortages. Despite 50 years of existence the economic status of the power industry remains very poor. A large part of the industry is not only financially weak to provide for any growth but is also unable to sustain a reasonable level of service to consumers. The pricing mechanism has led to a situation that, on an average for the whole country, tariff provides for only about 78% of the cost of supply. Besides the technical losses in the distribution system, which could be of the order of 8%–10%, theft of electricity in different states ranges between 20% and 40%. The reported figure of distribution losses of around 20% is under-represented because a good part of the loss is being shown as agricultural consumption. This has led to an annual loss of about 100 billion rupees, equivalent to a negative rate of return of 17%. What is more disappointing is the deterioration that has taken place even during the period 1992–97 when the private power policy was in action. The annual loss increased from 47 billion rupees to 100 billion rupees; the rate of return reduced from –12.7% to –17.9%; and the tariff coverage of cost of supply reduced from 82.2% to 78.9%.

There are many electricity boards which are doing reasonably well in so far as the utilization of their generation facilities is concerned. Some of them are achieving a plant load factor of over 75% and many are in the range of 60%–75%. But the problem of distribution loss and the issue of generating surplus on the sales of electricity have yet to be solved even in these boards.

When the private power policy was announced in 1991, the payment security comfort was envisaged through counter-guarantees. Since this could not have been a lasting solution and could not be extended to a large number of projects with substantial capacities, it was withdrawn. This led to the realization that the commercial working of this industry would not be able to inspire confidence in making investments in generation projects. Many professionals noted that the private power policy for generation projects would not succeed unless it was preceded by extensive privatization of the distribution business. Unless the industry provides a strong base of commercial working at the point of sale of electricity, it would be futile to expect huge capital investments in generation, transmission, and distribution projects and other related inputs like fuel, transportation, etc. Also, if there was doubt regarding servicing of the capital investment, investors would be lukewarm despite the most attractive rate of return in the policy.

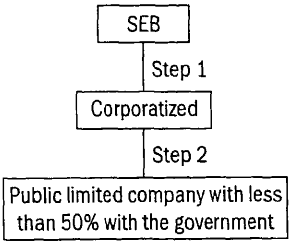
Options to restructure the industry

From the earlier analysis, it is clear that unless the distribution side of the power industry is properly reorganized to provide the financial and commercial back-up for investments not only in the distribution infrastructure, but also in generation, transmission, and other related areas of input, it would be impossible to secure the type of growth required for the industry. There could be various possible options for the structure of the industry, some of which are described below (Models 1–8).



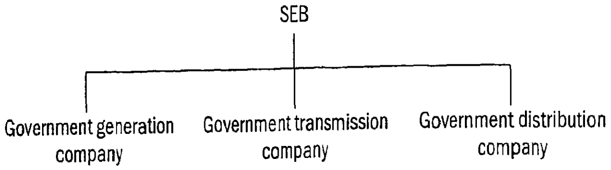
Model 1

Note The limitations are the government still has hold and can interfere; size is unwieldy; no competitive environment for customers.


SEB
Step 1
Corporatized
Step 2
Public limited company with less than 50% with the government

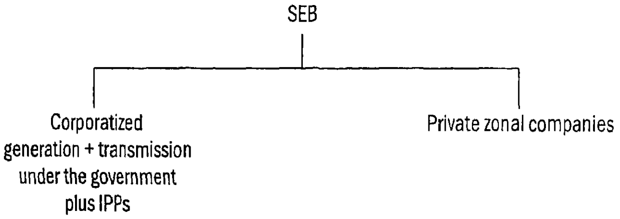
Model 2

Note The limitations are size still unwieldy; no competitive environment for customers.


SEB
Government generation company
Government transmission company
Government distribution company

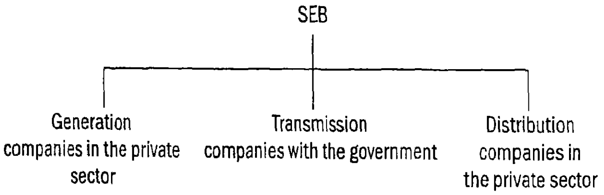
Model 3

Note The limitations are hold of the state government continues; no competitive environment for customers.

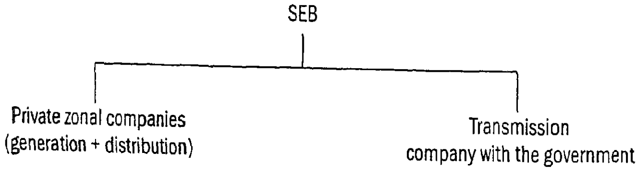

SEB
Corporatized generation + transmission under the government plus IPPs
Private zonal companies

Model 4

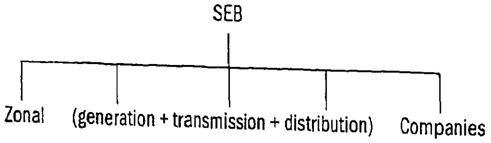
Note Competitive environment is created for customers.


SEB
Generation companies in the private sector
Transmission companies with the government
Distribution companies in the private sector

Model 5


SEB
Private zonal companies (generation + distribution)
Transmission company with the government

Model 6



Model 7

• Generation + transmission with the government • IPP • Private distribution companies	• IPP s • Transmission with the government • Private distribution companies
• Private companies having generation + transmission + distribution	• Private generation + distribution companies • Transmission with the government companies

Model 8

Note This is a combination of Models 4, 5, 6, and 7 all operating in the same state.

No single model can be recommended for adoption by all the electricity boards in the country. While many of the problems are common to most boards, there are different situations prevailing in different states. Tariff, distribution loss, and commercial problems exist in almost all boards, though in varying degrees. Some SEBs have been highly successful in the performance of their power stations. In fact, some of the SEB power stations have demonstrated better performance than even the power stations of the National Thermal Power Corporation. There are other states where each one of the three elements – generation, transmission, and distribution – is in trouble. The availability and plant load factor are low; the transmission and distribution network is weak; the distribution loss is very high; and commercial working is far from satisfactory. As such, different states may have to evolve their own model of restructuring. It is also not necessary that one model will work for the entire state. The state can choose different models for different areas. There could be areas where vertically-integrated companies, having their own generation, transmission, and distribution networks, operate successfully while in other areas other models may succeed.

From brief descriptions on various models presented above, it can be seen that Models 1, 2, and 3 have state control on each of the three elements. They suffer from the limitations of not creating a competitive environment for customers. Therefore, these models may not be the right ones to work with. In Models 4, 5, 6, and 7 the distribution side of the industry is placed with private players, that is, the service part of the industry remains under private management. These models therefore create a competitive environment in the state to enable customers to compare the quality of services offered by various operating agencies. Model 8 is a combination of Models 4, 5, 6, and 7. It is felt Model 8 presents the shape of the industry as it would probably look in the coming years. In other words, in the same state Models 4, 5, 6, and 7 could be in parallel operation.

Regulatory framework

A central legislation has already made provisions for the establishment of the CERC (Central Electricity Regulatory Commission) at the national level and the SERCs (state electricity regulatory commissions) in various states. The CERC has already been set up and many states are in the process of constituting their SERCs. For regulation in the Indian context, it is necessary to keep the following in mind.

- The CERC and the SERCs will have to send the right signals to the industry that, besides the interest of consumers, necessary motivation and incentives would be available to those who wish to invest in the Indian electricity sector. The situation that led to the formation of the CERC and the SERCs in India was entirely different from the context in which these institutions emerged in most other countries. India needs to double the power project capacities, transmission systems, and distribution networks over the next 10 years, and also develop related input industries. In the context of most other countries, the need to expand is marginal because facilities have already been created up to the saturation point.
- Regulation becomes very important once multiple players start functioning in the sector. It is important to synthesize the needs and expectations of various interest groups. At the same time, however, necessary care has to be exercised keeping in mind that too much regulation can be as counterproductive and ineffective as no regulation.
- Till now there have been no tangible results in the power industry because of delayed decisions and actions. While the process adopted by the regulatory system has to be transparent, objective, and democratic, one of the important requirements will be the speed of decision-making, which can sometimes be a casualty of the anxiety to take care of everything. Reconciling the process of consultation and involvement with the need for expeditious decisions will require a careful approach.
- There is no doubt that a competitive environment needs to be created to ensure that customers get the best advantage. This objective has to be at the core of every action. It is, however, equally important to motivate investors to enter the power sector. It must be recognized that in India, and elsewhere, investors have a wide spectrum of options. Therefore, their interest to invest in the power sector can be

created only if the regulatory mechanism, policies, and various systems and procedures provide an environment and assurance that investors will be able to earn sufficient return on their investment. Till now, only the consumers' interest in the power sector was considered. If this approach is continued, it is doubtful if investors would have the confidence to put their money in this sector.

- It is also important that a proper policy framework and guidelines are evolved by the regulatory institutions at the central and state levels, and the same are notified so that investors and developers are in a position to take correct decisions. Formulation of a policy which has a good degree of stability will also be important to avoid any uncertainty which could be highly counterproductive with regard to efforts of attracting investments for this sector.

TERI,
New Delhi

K Ramanathan

Choice of a power market model for India

Transition to a liberalized environment: experiences and issues in regulation 128–136

Introduction

The power supply industry in India is now over a century old. It experienced a slow and fragmented growth during the first 50 years of its existence. The enactment of the Electricity (Supply) Act in 1948 led to the consolidation of the industry, initially at the state level and later at a regional level. It also led to public sector ownership of almost the entire industry. The sector was mostly self-regulated. Although the industry has made rapid strides under this set-up, it is now being found increasingly inadequate to meet present-day challenges. There are serious concerns about its performance, regulatory efficiency, and ability to finance projects. Hence the power sector is presently going through a process of reform and restructuring as is the trend in many other parts of the world. Independent regulatory commissions are being set up and vertically-integrated utilities are being unbundled on a functional basis into corporate entities. Efforts are also being made to facilitate competition wherever feasible. The choice of an appropriate power market model assumes significance in this context.

Generic structures

The power markets operating in different parts of the world can be broadly classified into four basic generic structures.

1 Monopoly model
2 Single-buyer model
3 Third-party or open-access model
4 Power pool (wholesale market or spot market) model

The monopoly model offers little scope for competition. Hence, the choice centres around the other three models (Figure 1). Each of these generic models may have variations within itself in respect of the agency responsible for management of the market and its governance and regulation.

Single-buyer model

In a single-buyer model, a single entity purchases power from all generators on a competitive basis and in turn sells it to the supply entities. This model has the following advantages.

- It is simple and has minimum transaction costs.

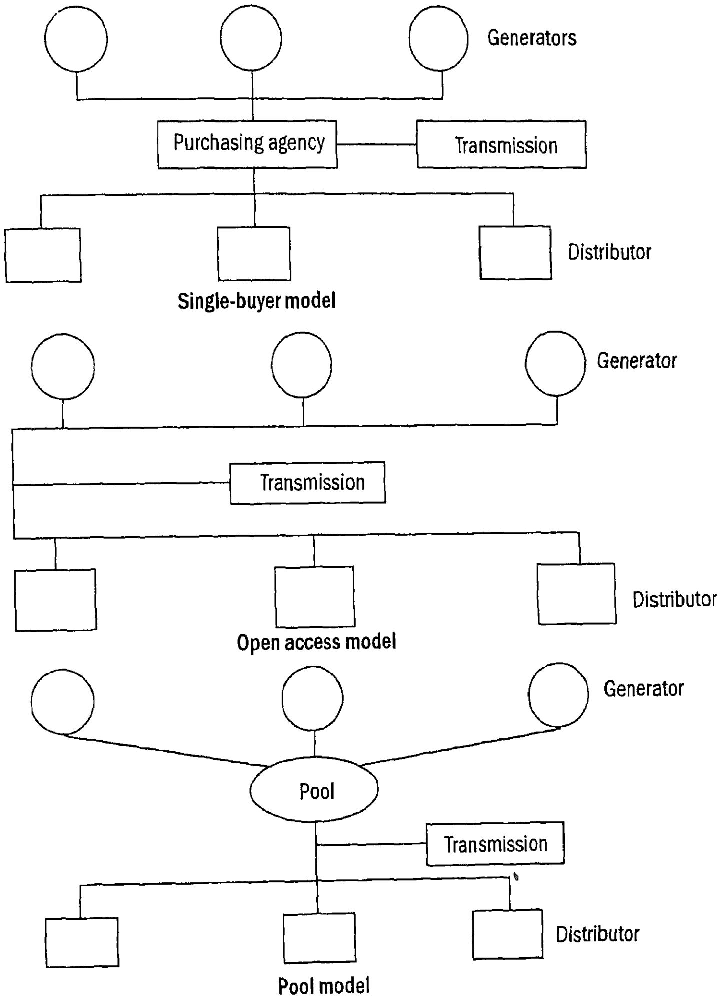


Figure 1 Generic models

- It facilitates design of equitable bulk supply tariff.
- Planning for capacity addition and strengthening of transmission systems is better coordinated.
- Splitting of existing contractual agreements with different generation companies is not necessary.

The demerits associated with this model are listed below.

- Competition is limited.
- The buyer may not have the incentive to seek out the most economical source of supply.

The above drawbacks can be overcome to some extent through the adoption of a competitive bidding system for power purchase by the single buyer and imposition of an appropriate regulatory control. For effective competition, it would be necessary that supply is not constrained and that no large generator commands excessive market power. Many developing countries are found to prefer a single-buyer model, especially during the transition phase of the reform.

Open-access model

Under the open-access model, the generators are in a position to enter into direct contract with distributors or large consumers without the need of an intermediary buyer. This, however, requires an open access to the transmission system. It is also important that the access to transmission is regulated and pricing policies are compatible, transparent, and efficient. The main merit of this model is that it provides a better platform for competition which would eventually help bring down the cost of supply. However, implementation of this model would entail the following.

- Transmission system development would become more complex with increased uncertainty in planning.
- The concern for stranded costs would increase.
- Transaction costs would be higher.
- Regulatory control on transmission access and pricing would be critical.

This model is being adopted in many countries where there is adequate redundancy in the generation and transmission system and the thrust is towards increasing competition especially at the wholesale level. In 1996, FERC (Federal Energy Regulatory Commission) of USA passed two orders to promote the functioning of this model. The first was Order No. 888, entitled Promoting Wholesale Competition Through Open-Access Non-discriminatory Utilities and Transmitting Utilities. This rule requires all public utilities that own, control, or operate transmission facilities to provide non-discriminatory open-access transmission services and provide for a stranded cost mechanism to help in the transition to a more competitive industry. The second, Order No. 889, entitled Open Access Same-Time Information Systems and Standards of Conduct, requires utilities to develop an Internet-based bulletin board system that will provide information about the availability of transportation capacity on transmission lines. The European Union directives relating to the authorization of IPPs (independent power producers), consumer selection facility, etc., also provide the framework for the development of a similar model.

Power pool model

The power pool model envisages different generators selling to a pool and the distributors or large consumers buying from it. The pool functions as a marketplace for trading. An open-access transmission system is a prerequisite for this model too. Compared to the other models, this one offers the best framework for competition. These pools are designed to maximize competition in generation, compete on price not cost, and remain open to all market participants. These are fundamentally different from the tight power pools that have been operating for many years in the US which were created to improve reliability, minimize operating costs, and facilitate decision-making by vertically-integrated utilities. The new type of pools are operating in England and Wales, Victoria (Australia), Alberta (Canada), and Scandinavia (Norway and Sweden), and at least 10 more countries are reportedly planning to operate these. The successful operation of these pools would require highly developed information and decision support systems and a strong reliance on the market forces. Although classified together, these pools present many variations regarding complexity of operation, governance, and regulation. The Nord pool which covers the Scandinavian countries and deals in spot and real-time trading appears the most complex. The pool operation may get vitiated if the transactions are heavily hedged by bilateral contracts. This is a concern in the case of the pool in England and Wales.

Opening up of markets

Competition in a power market is provided by generators and distributors. Competition in generation is normally reflected in wholesale tariff while competition in distributors (supply) is reflected in retail tariff. Since the bulk of the supply cost (nearly 60%, it is as high as 75%–80% in some Indian states) constitutes generation cost, the main benefit from competition is at the generation level. Thus, many countries are opening up the market at the wholesale level and then progressively moving towards retail level competition. For example, in France the market is being opened up under the European Union directive, providing a choice of supplier to all consumers with a power consumption of over and above 250 GWh (gigawatt-hour) per year by 2000/01. It is proposed to open it up further to consumers in the 8 GWh per year category (amounting to about 33% of customers) by 2002/03. Many governments are cautious in opening up the retail market. The apprehensions in this regard are cherry picking of influential customers, possible higher cost of supply to weaker sections of consumers (with serious social and political implications), added dimensions to the issue of stranded costs, etc. In developing countries with a supply constrained power sector and weak social security systems, it would be prudent to design the market for wholesale competition only, especially in the initial years of reform.

Prevailing market scenario in India

The choice of an appropriate market structure for India has to be necessarily related to the present operating environment and the extent of competition feasible/desirable. The state power utilities have not been operating on commercial lines. In this context, the following aspects also merit consideration.

- The Indian power sector has been going through a period of severe power shortages (both in terms of peaking power and energy) for several years and as such there is very little redundancy in generation and transmission facilities.
- Most states are now proposing unbundling of generation, transmission, and distribution functions as part of the reform programme. In fact, a few states have already unbundled generation activity from the others. Load dispatch function is assigned to the transmission entity.
- The power purchase agreements entered into / being finalized are long-term ones (typically 20–30 years) with committed take-offs and incentives for higher production.
- The power procurement costs from different generating stations vary over a wide range, depending upon whether these stations are old or new, hydro or thermal, central sector units or IPPs, etc.
- The average revenue realization is far below the cost of supply.
- The tariff structure is highly distorted with heavy cross-subsidization between consumer categories. Agricultural and domestic consumers have been enjoying a highly subsidized tariff for many years. From social and political considerations, it may not be practicable to drastically change the tariff structure overnight.
- Significant differences may be present in the tariff design applicable to different generating agencies. For example, certain modifications (availability and frequency-linked tariff) that are now being contemplated for central sector stations may not be applicable to others.
- The database of various financial and operational parameters needed for developing new pricing structures is presently lacking in most states.
- Load dispatch and communication facilities are yet to be adequately developed.
- Metering at the distribution level needs considerable improvement.

Evolution of market structure: suggestions

Keeping in view the pros and cons of the different power market models and the power sector scenario in India, a single-buyer model consisting of one BPSA (bulk power purchase/supply agency) appears appropriate at the state level. The main reasons in favour of this argument are listed below.

- As mentioned earlier, the costs of power purchase from different generating companies vary widely. The BPSA structure would ensure that no distribution company would get the entire or substantial benefit of low-cost power, while others are forced to purchase high-cost power.
- The consumer mix in different distribution zones may not be same. If near uniform tariff has to be maintained throughout the state (which may be needed to avoid widespread criticism of the reform programme), it would have to be achieved through a differential bulk supply tariff structure. An agency like the BPSA could implement this.
- It would not be necessary to immediately apportion the contractual commitments made by the electricity board / government to various generating companies amongst the distribution companies or to renegotiate the existing agreements.
- There would be better coordination in transmission system planning.

The BPSA would be contracting for or buying power from different generating companies on the basis of the price and the ongoing contractual commitments. Power purchase from mega power projects would be through the proposed power trading corporation and surplus power from other states through their respective BPSAs. Since the BPSA would be a monopoly entity, it will be licensed and power purchase would be regulated by the state regulatory commission. The power thus procured would be pooled and supplied to the different distribution companies as per contracts entered into with them. Although the BPSA would be normally supplying power to distribution companies only, there could also be a provision for direct supply to some major bulk consumers. This would be a step forward in opening up the market and promoting competition. However, such a provision would be seen as an erosion in the market share of prospective investors in distribution and might thus dampen the response from bidders while privatizing the distribution zones. This aspect has to be critically reviewed on a case-to-case basis.

In future, this model can evolve into an open-access model. The strategy for this would be to allow the distribution companies (after they are well established) to buy power directly from new generating companies but limited to the extent that is in excess of what is already committed to the BPSA. The existing power purchase agreements between the BPSA and different generating companies should also be progressively apportioned to the different distribution companies. Once this is achieved, the BPSA would have no role to play. The resulting structure would be similar to the open-access model.

The proposed evolution of the market structure is shown in Figure 2.

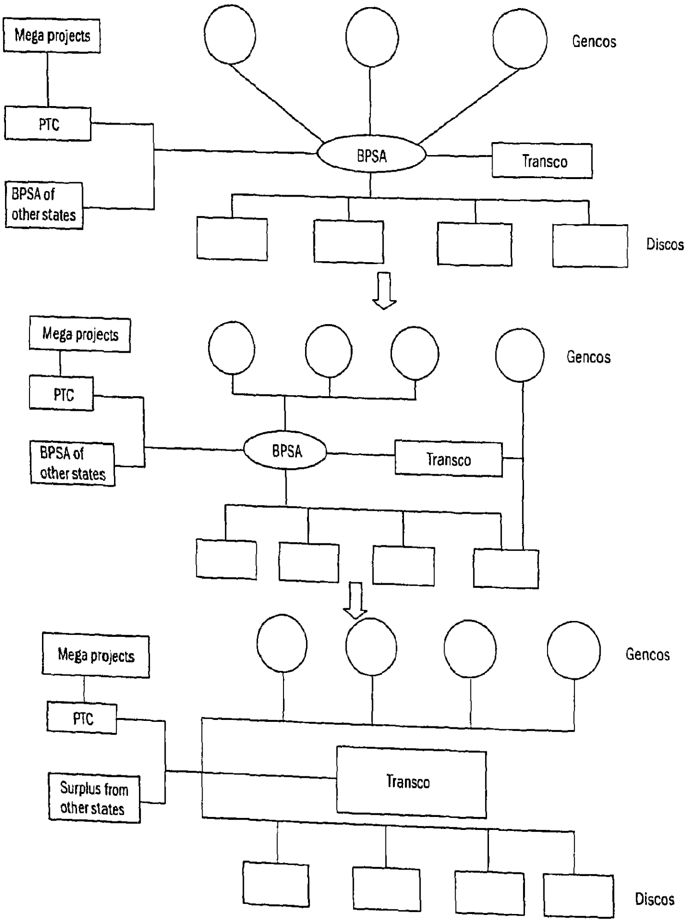


Figure 2 Proposed evolution of market structure
BPSA - bulk power purchase/supply agency
PTC - Power Trading Corporation

Agency for bulk power purchase and sale

Three options could be considered for the agency which has to function as the BPSA.

- The transmission company
- The SEB (state electricity board)
- A consortium of distribution companies

In many countries, the transmission company is taking over this role. In India, Orissa, Haryana, and Andhra Pradesh have also proposed this. The main drawback associated with this model is that the transmission company, instead of being a facilitator, would be required to do trading as well. This may present increased risk to the company and possibly lead to conflict of interests within the organization. As per its original mandate, the Power Grid Corporation of India was to handle the responsibility of the bulk trader; but later it was felt that entering into trading would not be advisable. In Gujarat, the possibility of the SEB continuing to perform this function (even after the generation, transmission, and distribution functions are hived off) is being considered. This would mean that the SEB is not totally abolished at the start of the reforms and a core unit continues to function. This entity could have an advisory group consisting of project analysts, engineers, negotiators, and a representative of the transmission company. It would have to be a licensee of the regulator.

The consortium approach has the advantage that the stakeholders are directly involved in the purchase. However, the success of this arrangement would depend greatly upon the spirit of understanding and cooperation among the distribution companies. Any conflict of interests between the consortium members could lead to delays in finalizing power purchase agreements, apportioning of existing agreements, etc. Past experience with the working of the regional electricity boards in India indicate distinct probabilities for such a situation. Also, there is the danger of cartel formation between the consortium and one or more groups of generators. In the initial years of the reform, the first two options appear more pragmatic. In either case, the agency in charge of system operation (typically the transmission company in the Indian scenario) would be concerned with scheduling generation as per purchase/sale agreements, real-time monitoring, and preparation of settlement accounts.

Conclusion

The choice of an appropriate power purchase/trading model is an integral component in the design of any reform programme. Three basic models are discussed and it is concluded that considering the power sector scenario in India, a single-buyer model would be best suited for the transition phase. The SEB may continue to perform this function or it may be entrusted to the transmission company. Yet another option would be a consortium of distribution companies. The pros and cons of these options have been discussed and the electricity board and transmission company options have been favoured. The agency would purchase power from different generating companies based on competitive bids. It would also take care that existing contracts are not violated. Surplus power from other states and power from mega projects would be contracted through the corresponding state-level agencies and the proposed power trading corporation, respectively. The power thus pooled would be supplied to different distribution companies and major consumers, adopting a differential bulk supply tariff wherever necessary. The provision for direct supply to major bulk consumers would, however, amount to a reduction in the market share for prospective investors in the distribution system. Hence, this option has to be exercised selectively especially in the initial years of reform. This model could gradually evolve into an open-access model.

National Economic Research Associates, Washington, DC, USA

Sarah P Voll and Michael B Rosenzweig

Reform and regulation in the Indian power sector

Transition to a liberalized environment: experiences and issues in regulation 137–156

Introduction

When Indian policy makers engage in the process of reforming the Indian power sector, they commit themselves to more than the first dictionary meaning of 'making better by removing faults or defects', a definition that implies that the sector can be redeemed by tinkering around the edges of tariffs, cross-subsidies, engineering improvements, and management incentives. Rather, they are undertaking the more fundamental process of reforming the sector, of forming it again and anew, of recreating its structures and relationships. In doing so, they join policy makers, utilities, and regulators around the globe who have re-examined the basic engineering and economic premises of their existing constructs in light of an emerging world of competition in production and choice for consumers.

In 1996, Sally Hunt and Graham Shuttleworth distilled NERA's (National Economic Research Associates) work over six years and six continents into *Competition and Choice in Electricity*, a work intended to provide a conceptual framework for policy makers in the new environment. They argued that the central idea underlying the new world of competition and choice in electricity was that it was possible and desirable to separate the transportation from both the production and the sale of the thing transported, that electric energy as a product can be separated commercially from transmission as a service. Once it is possible to define and separate transport service so that it can be provided separately from the electricity itself, then electricity becomes a product that can be made, bought, sold, and transported from place to place, much like any other product (although with some significant limitations peculiar to the nature of electric power systems). NERA has identified four basic market structures, the four alternative forms from which reformers can choose.

Market structure

The four models

Model 1 is the integrated monopoly. Generation is not subject to competition and no one, neither retailers nor final customers, has any choice of supplier. A single monopoly company handles the production of electricity and its delivery over the transmission network to distribution companies and/or to final consumers.

Model 2 introduces competition in generation and a purchasing agency. A single buyer chooses from a number of different generators to encourage competition in generation, and then resells to retailers (usually distribution companies) or is itself a distribution company. Generators have access to transmission wires but that access does not permit sales directly to distribution companies or to end-users. The purchasing agency has a monopoly over sales to the distribution companies and their final consumers. Transmission entities (possibly the purchasing agent) have exclusive rights to provide service in specific areas, as do the entities that supply electricity to final consumers.

Model 3 admits competition for wholesale supply. Distribution companies (retailers) purchase directly from independent producers over an open-access transmission grid. Transmission service is separated from supply and is provided as a monopoly in its service territory. Distribution companies also remain monopoly providers for sale and distribution of electricity within their respective service territories.

Model 4 introduces retail competition. All customers choose their supplier and there is open access to both transmission and distribution lines, although both 'wires' services are likely to remain monopolies in their service areas. Distribution, that is delivery, is separated from the retail supply activity, which is competitive.

The four models can be schematically represented as shown in Table 1.

Table 1 The four models

Characteristic	Model 1 Integrated monopoly	Model 2 Purchasing agent	Model 3 Wholesale competition	Model 4 Retail competition
Definition	Monopoly at all levels	Competition in generation; single buyer	Competition in generation and supply choice for distribution companies	Competition in generation and supply choice for final customers
Competing generators	No	Yes	Yes	Yes
Choice of power supply for retailers	No	No	Yes	Yes
Choice of power supply for final customers	No	No	No	Yes

Defining characteristics

The defining characteristics of the four models can be articulated by answering two sets of questions. First, who can sell what to whom and what are the trading arrangements; and second, who can own what, and which functions need to be separately owned.

Sales and trading arrangements

The trading arrangements are simply the rules that buyers and sellers (the traders) have to follow when they make transactions. Given the variable demand for electricity and the need for instantaneous response, the laws of economics and contracts yield to the laws of physics. There will always be differences between what traders contract for in advance and the actual generation and consumption. The market mechanism in each model must account for those imbalances and assure that they are paid for.

In Model 1, trading may take place between similar vertically-integrated utilities across a connector, coordinated through pooling arrangements that mutually provide back-up supply, increased security, and cost reductions by dispatching cheaper plants first. Short-term trading arrangements are normally based on short-term marginal cost. As the transactions are reciprocal, the price is not intended to cover the full cost of supply. The two utilities split the savings resulting from the less expensive dispatch while each utility's native load customers cover the capacity costs and receive (theoretically, at least) the benefits of the trade. The pool will institute elaborate arrangements to prevent free riders, including pool capability requirements and reserve margins, and to account for imbalances. Within each integrated utility, however, trading arrangements are not required. The supply to the final customer is not contracted for in advance and therefore no imbalances are created between what has been contracted for in advance and what has been consumed. Rather, the utility planner forecasts demand and builds or buys the capacity and energy to satisfy it.

Model 2 introduces the need for trading arrangements in the form of PPAs (power purchase agreements) between the purchasing agency and the independent generators. The pricing must cover full costs, including overheads, normally with an availability payment to cover fixed costs and an energy payment to cover variable costs of generation. Plants are then dispatched in order of their energy costs to achieve short-term efficiency. The independent producer is paid for availability whether or not the plant is operating, while the operating cost is a pass through. There is sometimes an effort to introduce incentives to be available through linking the payment intended to cover fixed costs to actual availability, enforced through penalties if they cannot generate when called by the dispatcher, and to reduce operating costs through linking the energy payment to an index. Sales from the purchasing agents to the distribution companies are governed by wholesale tariffs, preferably multi-part (capacity and energy) to mirror the purchasing agency's costs and follow system marginal costs, and these tariffs can be similarly mirrored by the tariffs between the distribution company and its retail customers.

In Model 3, the purchasing agent is replaced by a wholesale market. The major requirements for a competitive wholesale market are a system control function, a pricing mechanism and a settlements system. The dispatch function, independent of the traders in supply, is carried out by a system operator who assures that frequency and voltage are stable. Energy pricing is set through a spot market or power exchange where buyers and sellers bid to establish a spot price on an hourly or half-hourly basis. As energy is separated from transport, transmission prices are devised to reflect marginal costs of transmission and manage the use of congested paths in an economically rational manner. Traders contract with each other in a forward market or even a financial market (contracts for differences) and generators have the freedom of entry and exit to provide the necessary resources or to close uneconomic plants. A system to reconcile the flow of electrons with the flow of money is required, as there are multiple buyers and sellers transacting business under different system conditions.

There is a choice of market construct. In full cost pooling, generators recover all their costs including capacity costs as there are no longer native load customers to shoulder the fixed costs. Prices can rise very high for short periods of time though in practice traders hedge their risk through bilateral contracts and settle the differences between the contracts and the actual flows at spot market prices. The alternative construct is a wheeling arrangement where a utility that still owns generation opens its transmission wires to its competitors to deliver power that has been contracted bilaterally. Wheeling is more appropriate when there are few traders, but there is an intrinsic conflict of interest since the generators are competing for the utility's formerly 'full requirements' wholesale distribution customers, and as a result, the wheeling construct requires extensive and vigilant regulation.

Model 4 requires open access to all wires, distribution as well as transmission. Pricing of T&D (transmission and distribution) services must encourage efficient location and dispatch of producers and provide sufficient revenues to the wire owners. A spot market is essential, with a mechanism for settling imbalances between the contracted amounts and the actual flows. The function of metering and billing becomes a major problem. Again, a settlements system is essential since Model 4 has potentially increased the number of purchases significantly.

Ownership

While questions of ownership may involve matters of efficiency, the contentious policy issues of ownership fundamentally revolve around the elimination or mitigation of conflicts of interest. Model 1 is characterized by a vertically-integrated company that owns and operates generation and wires, reaps economies of scale by building larger plants, covering its service territory efficiently, and dispatching its plant economically. The only questions of ownership that arise are whether distribution should be separated from generation and transmission and the optimal area for a distribution company to cover. The answers to these questions depend on the economies of scope and scale: the similarity of the engineering problems of low and high voltage wires, and the potential for savings in billing systems and network maintenance. The evidence appears to suggest that the economies in the distribution function are exhausted at a fairly small size, overwhelmed by the advantages of having company management close to the customer. It is noteworthy that Electricite de France, which has studied the issue more than most, is fairly disaggregated at the distribution level.

Model 2 requires the independence of the purchasing agency. The single buyer needs to be creditworthy and independent from all generators with whom it makes long-term contracts. Purchasing agents that are utilities owning generation have been subject to calls to divest and accusations, often well-founded, of self-dealing in its purchasing decisions. There is no particular reason that the purchasing agency cannot be owned by the transmission company as long as the transmission company does not own generation, although the two businesses of transmission and bulk supply do not involve any particular joint economies of scope.

The introduction of wholesale competition of Model 3 eliminates the role of the single buyer as generators deal directly with the distributors. Transmission itself encompasses three functions. The operator keeps the system stable and acts as a traffic controller and if it is not independent of the buyers and sellers, it must be heavily regulated. The transmission service provider, usually but not necessarily the owner of the wires, sets the terms of access and collects enough revenues to pay for the use of transmission assets. Finally, the energy market operator is responsible for policing the arrangements to settle imbalances between contracted amounts of energy and actual flows. Again, this role must be either independent from the traders or heavily regulated. The three functions may be integrated but do not have to be. There are some conflicts of interest related to self-dealing between the function of transmission provider and of system operator or market operator as the actions of the latter two can affect the revenues of the former. There are no conflicts between the dispatcher and the market operators, but neither are there economies of scope as the skill sets for the two functions are quite different.

More seriously, generation must be kept separate from retailing. The incentives to self-deal, purchasing from overpriced affiliates and passing the excess costs through to monopoly customers, are both irresistible and very difficult to police. Issues of market power in generation can also arise. The remedies are either structural, breaking up the generation of the previously integrated company into smaller units, or regulatory, regulating either the results through profit or revenue caps or the conduct by limiting the prices that can be charged.

Model 4 opens both the wholesale and retail markets to competition and choice of supply. Distribution becomes a wires business, with the implication of being a bottleneck provider. As such, there is the potential for self-dealing, since the distribution company will have the incentive to assure service continuity to those customers who purchase energy as well as the transportation service. The magnitude of the concern for self-dealing will probably depend on the level of profits in the retail supply business and may be offset by countervailing interests. Customers do not always believe that the ability to choose is necessarily a blessing and may prefer to be served by a single provider. Also, the wires company may always need to serve as the supplier of last resort and stand ready to provide back-up energy when other suppliers fail. In any case, if regulators allow the distribution company to enter the retail supply business, they may want to limit the terms under which they can trade.

There is no obvious reason why T&D cannot be combined, although the economies of scope may depend mostly on the historical operation of the two functions. There are some advantages to multiple distribution companies, in that they will be closer to customers and permit yardstick regulation. Regulators would have to be alert to bias if the transmission company owned one but not all of the distribution companies. This potential for bias argues for a prohibition on transmission company ownership of distribution companies, prohibitions that indeed, absent permission from their regulator, have been adopted in Orissa and Haryana. Interestingly, in contrast to Model 3, there is no longer a need to separate retail supply from generation because the end-user can find another supplier and there may be a natural integration of the two functions as generators seek to deal directly with the ultimate consumer.

Implications for public policy

Each of the four models has unique implications for three important policy considerations: economic efficiency, social policy obligations and regulatory framework, and the reformers' choice of structure will depend not only on the engineering and information complexities but on their other public policy objectives as well.

Economic efficiency

Economic efficiency in Model 1 is achieved through the economies of scope and scale of the integrated operation of the utility. However, since revenues and pricing are usually based on some form of cost of service calculation (in the US rate base / rate of return and in India the Sixth Schedule to the Electricity [Supply] Act, 1948), the challenge is one of creating incentives in a cost-plus environment. Various forms of incentive regulation have been proposed to detach prices from cost, although in those jurisdictions in the US that do not require annual tariff filings, the major incentive is the regulatory lag between rate cases. Regulatory lag is a sort of price cap with no escalation (RPI-x) clause. In addition, short-term efficiencies can be achieved through pool-wide dispatch of generation. A major source of inefficiency is in power planning and procurement, and regulators have sought to mitigate problems in this area by imposing integrated planning processes that at least require explicit consideration of all demand- and supply-side options and may extend to directing the utility's choices as well.

Despite efforts at incentive rate-making and imposed planning requirements, Model 1 customers do not fare well in unsettled times. In its cost-plus environment, they bear most of the risk and pay for much of cost of mistakes in investment decisions, changes in demand, and unanticipated technological obsolescence.

Most of Model 1's cost overruns stem from construction. Model 2 reflects the move to replace the planning process with competitive bidding and a market orientation, and these construction related incentives for efficiency persist into Models 3 and 4. Once chosen through a competitive bid process, the relationship between the purchasing agency and the independent power producer has historically been governed by a long-term contract. Such contracts generally result in a lower overall cost of capital for the project as they insulate both the purchasing agency and the generator from the market risks of changes in demand and technology, and the variations in fuel costs. Generators in this setting do not compete with new entrants, which undermines the incentives for efficient operation; also where greater than anticipated efficiencies are achieved, they are not impelled to share the benefits of those savings with consumers. Efficient dispatch is possible if the contracts are crafted so that the energy payment equals the marginal cost of operating the plant (i.e., not 'must run' plants paid on a combined cents/kilowatt tariff covering both capacity and energy). Efficiency in consumption decisions, at both wholesale and retail, will depend on how well the relevant tariffs reflect the marginal costs of supply and transportation.

In Model 3, the choice of generation assets, their quantity, fuel type, and time, is left to the market. Generators will prefer long-term contracts, but once a spot market is established, they are no longer essential, as the appearance of merchant plants in the US attests. Contracts are used to share price risk rather than to assure performance on both sides. The spot market itself is a powerful tool to enhance efficiency. On the generation side, a low-cost generator selling at spot, can be viewed as, in effect, selling to a high-cost generator who backs off its own unit and uses the power to meet its contractual obligations. On the consumption side, the spot market always clears at some price, which is a major improvement over the more artificial and cumbersome time-of-use and interruptible rates in wholesale tariffs.

It is not clear what incremental efficiency gains are achieved in Model 4's retail access, especially since the transaction costs are not negligible. The general arguments for competition apply (efficiency in production, investment, and consumption), although many can be attained under the other models. On the supply side, the demands of new entrants with new technologies become insistent. However, entry is not necessarily efficient if the existing plant is sufficient to serve the market and would not occur if the price of the existing plant were based on its marginal cost and its capacity costs were considered sunk. Model 4 does offer the benefits of a more competitive market on the customer side, achieved through the search for low-cost providers and response to real-time pricing. However, efficiency gains achieved through customer choice at this level require a level of effort in seeking low-cost alternatives that most customers are reluctant to devote to their purchase of electricity.

Social policy obligations

A major attraction of Model 1 that carries over to Model 2 is the ability to accommodate social policy obligations, sometimes to the extent that the public utility becomes a tax collector and instrument for the redistribution of wealth. The utility's revenue requirement can be inflated to accommodate high local taxes and above-market employment policies. In generation, government can mandate a diversity of favoured fuel sources regardless of their economics, and does so to nurture renewable resources or promote nuclear energy or employment-related fuels such as coal. It is possible to impose environmental regulations on emissions of generating plants in excess of those that the relevant environmental agencies require for all other industries. At the retail level, prices can be manipulated to support social goals through cross-subsidization: geographical averaging that imposes uniform pricing despite cost disparities and rural electrification; discounted tariffs to promote economic development or lifeline programmes for low-income domestic customers; and non-economic utility-sponsored conservation programmes. All these programmes result in above-market prices that can only be supported by the utility's monopoly position and a strong demand.

In Model 3, generation becomes a market, not a regulated monopoly/monopsony purchasing agent. The ability to accommodate generation-related obligations through pricing virtually disappears. Promotion of specific fuel programmes is possible only through direct subsidy mechanisms that lower the price of the output to be competitive in the market. Non-generation subsidies and cross-subsidies can be continued as long as the cost is embodied in the retail monopoly and customers cannot avoid the charge.

In the retail competition of Model 4, it becomes impossible to cross-subsidize through energy prices. It is still possible to impose explicit, non-avoidable levies on all retail sales or charges on the still regulated monopoly wire companies, both to support below cost tariffs to selected customers and programmes like conservation and high local taxes. Cross-subsidies through the retail price structure, however, are no longer possible, because with retail competition the end-user subject to above-market prices will find another seller.

Regulatory framework

Regulation is the means of imposing market discipline where markets do not function properly. A defining social development of the last quarter of the 20th century has been the conceptual conquest of market-based economic philosophies over central planning. Relatively unconstrained markets are simply the best mechanism for efficiently producing the best mix of goods and services for society. However, there is also no question that there are instances where markets do not perform properly, the situation economists call 'market failure'. In these instances, regulation is required to provide a surrogate for the market, to enforce the requisite economic discipline that the market cannot or does not provide.

Given this job description for effective economic regulation, it is clear that the choice of industry structure will determine the requirements for regulation. The basic axiom is that regulation is appropriate only in those sectors of the industry in which a competitive market is infeasible; and the corollary is that one should regulate in ways that will produce the most market-like results. The government's role is to assure that markets stay competitive, and the challenge for regulators is to be willing to accept the results of the competitive markets that are being established.

The analytical challenges in examining the four models of market structure are to

- distinguish separable businesses
- identify those separate businesses that possess competitive characteristics and determine regulatory requirements for non-competitive elements
- determine the requirements to promote competition in unregulated segments, possibly including restrictions on ownership to prevent conflicts of interest.

Generally in the power sector, the segments of the industry for which constructive competition is commonly accepted as infeasible are those related to network services of transmission and distribution. Whether the sector's remaining functions can be competitive will depend on the reformers' choice of market structure. Table 2 delineates the requirements for pervasive economic regulation in each of the four models.

Table 2 The requirements for economic regulation in the four models

	Model 1 Integrated monopoly	Model 2 Purchasing agent	Model 3 Wholesale competition	Model 4 Retail competition
Generation	Yes	No	No	No
Transmission	Yes	Yes	Yes	Yes
Bulk supply	Yes	Yes	No	No
Distribution	Yes	Yes	Yes	Yes
Retail sales	Yes	Yes	Yes	No

Reform of the Indian power sector

Market structure

The choice of market structure in a reformed power sector must reflect current technical, political, and social realities as well as long-term aspirations for the industry and each option should be measured against a consistent and comprehensive set of criteria. The following criteria were developed for the 1994/95 Restructuring Study for the Haryana Power Sector, a restructuring project led by NERA for the Government of Haryana. The criteria and the resulting recommendations were subsequently transferred to Orissa and formed the analytical basis of the Orissa reform project.

- *Commercial viability/autonomy* – The ability to manage power sector entities, subject only to normal commercial pressures and incentives, legal constraints, and well-defined service obligations.
- *Financial viability* – The ability to finance activities through normal profits and private investment.
- *Efficiency* – Efficiency in generation, transmission, and distribution, and in consumption decisions.
- *Optimizing the system* – The ability to make the best use of resources while balancing supply and demand.
- *Operational feasibility* – The lack of operational constraints.
- *Legal feasibility* – The need and capability of making changes to statutes.
- *Reduction in corruption* – The ability to reduce the various aspects of corruption.
- *Consumer protection* – The ability to regulate prices effectively or employ competition to protect consumers.
- *Acceptability to stakeholders* – How acceptable an option is to the consumers, employees, managers, and the government

The status quo in Haryana and Orissa, as in most of India, is Model 1, an integrated monopoly utility owned by the respective state. The diagnostic assessment of the Haryana power sector, also shared by most other states, made the following conclusions.

- The current power sector does not meet the needs of the state. Capacity is insufficient to adequately support economic development, and both the quality of power and the service supplied to customers are inadequate.
- The sector cannot raise the capital necessary to correct system deficiencies. It realizes inadequate revenues to generate funds internally or raise funds from private, external sources. Government funds are also insufficient.
- The inadequacy of revenue realization stems from non-compensatory tariffs, insufficiently offset by government subsidies; inefficient system operation and management; inadequate management of the metering, billing, and collection functions; and high non-technical losses in the system.
- The SEBs' (state electricity boards') ability to correct the above deficiencies is severely constrained by the substantial involvement of the state government; organizational and management inefficiencies imposed by civil service regulations and union activities; and statutory and regulatory limits on SEBs that substantially restrict managerial options to respond to deficiencies.

It will come as no surprise, then, that measured against the reform criteria, the status quo Model 1 structure fared most poorly, scoring zeros in any of the criteria relating to commercial viability, efficiency, and reduction of corruption.

The remaining structures performed significantly better against the criteria with the competitive structures having a slight edge over the single-buyer model in areas of efficient production, an optimized system, and consumer protection. However, the wholesale competition model requires that all distribution companies should operate on a firm commercial basis, a condition that probably cannot be satisfied without some prior structural reform. Significant infrastructure development for the sector is another prerequisite to deal with settlements and pricing imbalances. The retail competition model requires a level of technical sophistication in the operation of a spot market, mechanisms to settle imbalances, and resolutions to the complexities of metering and billing not yet achieved by most power systems around the globe.

For the near term, the 'reforming states' of Orissa, Haryana, and Andhra Pradesh have adopted 'The Orissa Model', which was first recommended in Haryana and is a variation of Model 2. It entails 'divisionalization' and 'corporatization' of the SEB's assets, divesting it of its generation assets and distribution system. The residual SEB is designated as the Transmission System Operator with responsibility for operating the transmission system. It also acts as the purchaser of power, and is therefore responsible for the long-term power planning for the entire state.

The commercial foundation of the generating company flows from its contracts with the purchasing agency and the fuel suppliers, and hence depends on the financial viability of the purchaser (or financial guarantees from the government). Additional capacity would be built by the private sector, normally through a competitive process instituted by the purchasing agency which would identify potential suppliers and select new generators on a least-cost basis.

The distribution function would be decentralized in order to place management of the service component in closer proximity to customers, making it responsible for the financial and operational performance of a discrete and measurable entity, and increasing the difficulty for outsiders to interfere in the sector. The distribution companies can be designed to be broadly similar in cost structure so that initial statewide uniformity of tariffs can be sustained. In the longer term, cost differentials can be smoothed first in privatization through adjustments in the valuation of the companies and later, if desired, through direct government subsidy programmes for rural electrification or a specific customer class. A limited number of separate distribution companies would allow the regulator to press for efficiency improvements through yardstick regulation, and form the basis for evolution into a Model 3 structure at some time in the future.

The transformation of the SEB into a transmission system operator and purchasing agent requires a redefinition of its purpose and its legal relationships. Various agreements are required to specify the operating interfaces, modes of operation, and rules and responsibilities for sector participants. These include shared asset agreements, leases and licences, power purchase agreements, connection agreements with distribution companies and generators, grid codes, and distribution codes. These will need to reflect the newly autonomous nature of the separate entities.

An advantage of the Model 2 structure for the near term is that it allows a perpetuation of the social policy obligations of the sector through a transition period. It is still possible to subsidize and cross-subsidize specific classes of consumers, although tariff reform and commercialization of the distribution companies require that all price and subsidy programmes become more transparent, and ultimately, many reduced or eliminated.

Regulatory structure

Regardless of the structural model chosen for the sector, the sine qua non of any reform project is the creation of an independent regulator. A credible regulatory body is the only way to balance the variety of power sector interests, giving investors confidence that the sector will be operated on a commercial basis, protecting consumers and pressing for increases in efficiency. NERA makes specific recommendations on measures that ensure the agency's independence, including the composition and qualifications of the members, their appointment process and tenure, and the funding, functions, powers, and standards for the agency.

The primary responsibilities of the Model 2 regulatory regime are efficient tariff regulation for those parts of the industry that retain monopoly power and the duty and authority to promote and protect the competitiveness of those segments that will rely on the market. The grid company and distribution companies will operate under a monopoly franchise for a defined area and will be regulated with respect to tariffs and quality of service. The form of regulation will initially be cost of service but the regulator should be empowered to adopt performance-based regulation to enhance the incentives for efficient and economical operation. The regulator will also need to review the efficacy of procurement activities, especially for the transmission company-cum-purchasing agency.

One of the greatest challenges for the regulator of a Model 2 structure is to refrain from cost of service regulation of generation, the sector deemed to be viably competitive. Its regulation of generation is of procurement, the 'buy side' function of the purchasing agency, not of the 'supply side' or sale function of the independent private generator. The regulator's role is to assure that the procurement process is competitive, and then to accept the market results of that competitive process.

Indeed, understanding when not to regulate, and acting on that understanding, has proven to be one of the most difficult conceptual adjustments in the transitions from centrally planned, command and control industry structures to the efficacy and efficiencies of a market-oriented environment. It is a philosophical shift required of government, regulatory commissions, and companies whenever, and wherever, they move from one structure to another, whenever they reform the fundamental model of their public utility system. But knowing when not to regulate a competitive market is as essential to the success of the reform effort as knowing how to regulate the monopoly entities.

Implications of structure for pricing and tariff policy

Just as the framework of regulation is determined by the choice of market structure, so too is the approach and methods of regulating the various components of the sector. Nowhere is this truer than in the regulation of tariffs and pricing policy. The contrasts between the appropriate methods and levels of regulation for different parts of the industry are especially stark in Model 2.

Bulk supply and transmission

Model 2 assumes that generation will be competitively sold to a single buyer. The wires businesses, both transmission and distribution, and the supply businesses, at both wholesale and retail, are monopolies.

As noted above, regulation of generation must focus on the creation and preservation of a competitive market. Regulators no longer need to (indeed must not) perform a detailed analysis of the capital and operating costs of the generating facilities. These facilities will be built by independent power producers who will bid their output into the market. Rather, regulators, both the electricity regulatory commission and the Department of Company Affairs, must ensure that the market is and remains competitive, that there are a sufficient number of sellers, and that there are no conflicts of interest stemming from cross-ownership. And then (the excruciatingly difficult part) they must trust that market to produce the least-cost result. The responsibilities of the regulatory commission in this transaction are to regulate the buyer. There they ensure that the monopolistic bulk supplier's competitive bid process is effective and transparent, including that it has adequately proven its need for power, and that its proposed PPA (probably long term) promotes efficiency in dispatch and includes incentives for efficient operation.

One issue under review in Orissa is whether new centrally planned generating facilities should be subject to the process of competitive procurement. The difficulty arises because the timing of an offer of a share in a central unit may not coincide with the bulk supplier's competitive bid process (or vice versa). Unfortunately, without such a process, neither the bulk supplier nor the commission will have a standard by which to judge whether the offer is least cost in the specific market in which the bulk supplier is purchasing.

Since the bulk supplier is the monopoly provider of power to the distribution companies, that sale must be regulated and the prices set by tariffs. The tariff will merely pass through the costs of bulk supply to the distribution companies; bulk supply is a marketing function with no significant capital investment in itself and therefore any mark-up in price need cover only the bulk supplier's administrative costs. Assuming that the bulk supplier's approved PPAs promote efficiency by reflecting the marginal costs of supply and transportation, their wholesale tariffs should mirror the PPAs in order to encourage efficient consumption decisions by the distribution companies. These price signals will be critical as the distribution companies consider the economics of demand-side management programmes and purchases from captive power plants in relation to purchases from the bulk supplier.

Whether or not the same entity holds both the bulk supply licence and the transmission licence, as is likely, the tariff should be unbundled to identify separately the bulk supply and transmission functions of any charges. As the OERC (Orissa Electricity Regulatory Commission) noted in its paper on *Conceptual issues of electricity tariff in Orissa*, 'to the degree that pricing for the individual functions can be separated with a monopoly structure, consumers receive clear signals regarding the costs of different components of the service' (Issue 7). In particular, as the sector approaches privatization, 'tariffs separated into their functional components inform both consumers and potential investors of the cost and revenue stream attributable to each functional entity'. Even though the OERC saw no pressing need to unbundle retail tariffs at that time, it recognized the need for a separate transmission tariff that could be used as a wheeling charge for captive power plants and other generators selling across the system.

Distribution and retail supply

Model 2 assumes that the functions of distribution and retail supply are monopoly services, in all probability combined in a single licensee, who purchases its power supply and transmission services either together or separately from the bulk supply and transmission licensee(s) and resells them to the end-user. It is in the design of the distribution and retail supply function, and in their tariffs, that most of the policy issues surface regarding regulation and pricing. Because the functions are of monopoly nature, it is possible to continue to satisfy the social policy objectives of an integrated (Model 1) system, and the regulator must balance these objectives against their fundamental responsibility to promote efficiency and economic viability in the sector. Three issues of particular interest have arisen in Orissa (1) geographic disaggregation,

(2) inter-class cross-subsidies, (3) and technical and non-technical losses.

Disaggregation

It is the intent of the power sector reform in Orissa to disaggregate the distribution and retail supply function into four geographical zones that can be privatized as four separate companies. Gridco has therefore corporatized the four zones, applying for four separate licences. Whether or not the zones are subsequently privatized, the existence of separate distribution and retail supply entities raises interesting regulatory and pricing issues and opportunities. As noted above, the advantage of decentralizing the distribution and retail supply function is that it places the management of the service component in closer proximity to customers, makes it responsible for the financial and operational performance of a discrete and measurable entity, and increases the difficulty for outsiders to interfere in the sector. This offers the opportunity for the institution of some form of performance-based regulation, at the very least comparisons of the efficiency of the performance of the four entities (yardstick regulation).

Disaggregation does raise the issue of statewide uniform or zonal tariffs. In its 1998/99 tariff filing, Gridco provided the financial information for each of the four zones but nevertheless requested a uniform tariff. However, in its *Conceptual Issues* paper (Issue 10) the OERC observed that while historically uniform tariffs have prevailed in Orissa in spite of significant geographic cost differences, differential tariffs that vary in relation to cost differences generally make better use of society's resources than do uniform tariffs. The commission stated that the principle of tariff continuity should not be allowed to preserve inefficient tariffs indefinitely. It noted that the tariffs of different electricity supply companies have been different from those of the SEBs in states where such supply companies exist. Different distribution companies may have different tariffs depending upon their respective costs, standard of service, etc. In fact, differential tariff based on cost differences for different zones is a natural outcome.

Inter-class cross-subsidies

One of the most pressing needs for reform in the power sector is the elimination of inter-class cross-subsidies, which generally overcharge industrial and large commercial customers in order to provide agricultural, domestic, and small commercial customers with power at prices below cost. The process is politically compelling, but economically inefficient and ultimately not sustainable. The overcharged classes turn to alternative sources of power in the form of captive power plants, leaving the grid except for back-up and emergency power. As they leave the system, rates for remaining customers inevitably rise.

The Orissa Electricity Refrom Act recognized the need to eliminate cross-subsidization, requiring that tariffs not show undue preference to any consumer of electricity allowing differentiation of tariffs only according to such cost-based criteria such as load factor, power factor, total consumption, or time of use (Section 26[5][a]). The Act recognized that the government itself must fund the subsidies to any classes of customers or geographic areas its policies identified as deserving of less than cost-based rates (Section 12[3]). It could no longer expect the sector itself to internally tax some customers for the benefit of others.

An advantage of the Model 2 structure, however, is that removal of the sector's social obligations can occur over time. The OERC views the attack on sector inefficiencies as a multifaceted effort and has linked the elimination of cross-subsidies to improvements in the quality of power, reductions in technical losses and theft, and the installation of meters. Thus, it has adopted both a Grid Code and a Distribution Code, and has ordered Gridco to develop appropriate plans for achieving the standards of performance embodied in the codes, and to file these proposals along with its plans to reduce losses, install meters, and phase out cross-subsidies. Price increases to formerly subsidized consumers in the name of economic efficiency, the commission argues, must be accompanied by improvements in quality of service and in the efficiency of the utility's own operations.

Technical and non-technical losses

Finally, no one questions that sector viability depends on the reduction of system losses. Such losses, stated the OERC, 'threaten the licensee's financial health and keep prices unnecessarily high to the paying consumers' (*Conceptual Issues*, Issue 2). The losses in 1998 in the Orissa system have been estimated at 46.6%, about half of which are non-technical (miscalculation of load factor billing, inadequate billing systems, and theft). Improvements in technical losses will admittedly require time and capital. In contrast, reductions in non-technical losses primarily requires vigorous and sustained management attention.

The issue of non-technical losses gave the OERC the opportunity to experiment with incentive rate-making, and its ruling in its November 1998 tariff order in this regard was one of the most controversial in the order. In the 1997 order, the commission had not been persuaded that customers should bear the costs of the then estimated 42% level of losses ('since it is difficult to describe operating at such levels as efficient') and determined that 35% was a more reasonable loss level. In Section 10 of the November 1998 Tariff Order, the commission stated

> *That decision was the result of the process that this Commission continually employs as it carries out its functions, namely balancing the interests of the licensee with those of its customers. We know that we must set tariffs that allow the licensee a reasonable opportunity to earn revenues that are sufficient for operating, maintaining, rehabilitating and expanding the system to provide a proper quality of service. However, we must also not force customers to pay for inefficient licensee behaviour. We must carry out the same balancing in this proceeding.*

Gridco based its 1998/99 filing on a proposal to reduce its total loss rate for the system from 46.6% to 41%. However, the commission was not convinced that Gridco had been efficient in reducing losses thus far, and found little in the record to assure them that Gridco will succeed in achieving its target. Rather, the commission observed

> *It is equally likely that Gridco will repeat its poor performance of past years and once again discover that its losses are higher than either the level it estimated previously or that it has committed to meet. Further, we remain convinced that it is unreasonable to expect consumers to bear the burden of system losses that result from Gridco's inefficiency and mismanagement in this area and for tariff purposes will maintain the level that we accepted for the existing tariffs.*

The commission was willing, however, to consider some measures of performance-based tariff design. Therefore, it treated the amount of difference between the revenue requirement calculated on the basis of Gridco's estimated T&D loss of 41% and the revenue requirement calculated on the basis of the reasonable level of 35% as, what is termed in the US, a 'regulatory asset'. It will be considered for inclusion in the revenue requirement for tariff purposes only when Gridco or its successor licensees produce evidence of having reduced T&D losses to the benchmark of 35%. Below that benchmark, the commission was also willing to consider increasing the return from the existing level by one percentage point for every percentage decrease in the T&D losses. Such incentives may not be sufficient to motivate Gridco under its current ownership to attack the problem of non-technical basis, but they certainly provide an opportunity for any privately owned successor company.

Conclusion

The OERC, as India's first state electricity commission, has been clear-sighted in its approach to regulation, balancing the interests of the utility and the consumers and tailoring its scope and methods to the chosen market structure. It has regulated where it must, provided incentives to efficiency where it could, and refrained from imposing regulation where it was not needed. It has been a matter of considerable satisfaction to NERA to have participated in the creation of a commission that so well understands and discharges its mission.

Office of the Regulator-General, Melbourne, Australia

Sohail Hasnie

Deregulation, privatization, and promotion of competition: an Australian success story

Transition to a liberalized environment: experiences and issues in regulation 157–182

Introduction

For over 75 years, the SECV (State Electricity Commission of Victoria) was the primary body responsible for the generation, transmission, and distribution of electricity in Victoria, Australia. In 1993, the SECV had about 12 000 employees with a total generation of 36 000 GWh (gigawatt-hours) for 1.7 million customers.

Despite strong opposition from various quarters, the government decided to break up the SECV along vertical lines and privatize the whole industry. The leading newspapers commented that the government was likely to get about 9 billion dollars[1] for the whole SECV, whereas privatization receipts from distribution alone was 8.3 billion dollars.

A part of the deregulation exercise was the setting up of a wholesale market for electricity, which has resulted in price discounts between 30% and 40% for large customers. Small customers, who pay a regulated 'maximum uniform tariff' received regulated price discounts up to 22% from the 1992 price levels.

An independent office for regulation of the industry was established in 1994 to ensure that the benefits of the restructuring of the electricity industry are passed on to customers both in the short and long term.

This paper describes the reform in Victoria with particular focus on the competitive wholesale market for electricity, customer's choice, and regulation.

Electricity industry before deregulation

The SECV was one of the largest public sector organizations in Australia, employing 11 986 people as on 30 June 1993.

As the principal supplier of electricity throughout Victoria's 228 000 square kilometres, the SECV generated, transmitted, and distributed electricity to 1.7 million customers directly and to a further 292 000 customers who were supplied by the 11 municipal authorities, which purchased electricity from the SECV.

---

[1] Dollars in this paper refer to Australian dollars.

The installed generation capacity including Victoria's share from external sources was 7763 MW on 30 June 1993, with main power grid systems comprising 500, 330, 275, and 220 kV lines.

In 1993, the SECV made total retail sales of 4.09 billion dollars that resulted in a profit of 207.4 million dollars, of which 150 million dollars was paid as a dividend to the Victorian government. The SECV had an accumulated debt of 5.9 billion dollars against an asset of 11.2 billion dollars.

The deregulation debate

The Victorian government describes the environment that lead up to the initiation of the privatization process as follows.

> *When the Victorian Coalition Government was first elected in late 1992, Government Business Enterprises were an underperforming but substantial part of the State economy. The State Electricity Commission of Victoria (SECV) was one of the largest State-owned enterprises.*
>
> *By 1993, the SECV was carrying almost $10 billion of debt, and 30% of its revenue was being swallowed up by finance charges. Electricity prices were 40% above the most efficient Australian State (Queensland) and well short of world's best practice, despite Victoria having an abundance of relatively low-cost brown coal and gas reserves as a natural resource. Construction costs of new plant were 60% higher than would be expected under best practice and generation availability was around 65% compared to current availability standards in excess of 90%.*
>
> *GBEs were often motivated by the availability of Government guaranteed capital rather than sound investment practices. An example of poor planning occurred in 1980 when the SECV presented a report to Government on power stations, which despite massive overcapacity in the system, foreshadowed the construction of 21 future power stations in the Latrobe Valley.*
>
> *The Victorian Government's philosophy is that governments should not be owners of commercial endeavours, as the inherent risks are better handled by the private sector. This allows Government to concentrate on its key social obligations of education, health and law and order – its 'core business'.*

The Victorian Labour Party (opposition party) in its policy document argued that the majority of Victorians opposed the sale of the SEC as it would mean a transfer of valuable, publicly-owned assets to overseas interests; a rushed sale at fire sale prices affecting state finances, leading to higher taxes; sell-off of the electricity industry involving higher prices and more fees; and the private companies seeking to maximize profit thus neglecting the environment.

First stage: vertical disaggregation

In August 1993, the Victorian government announced its intention to disaggregate the SECV into three interim operating businesses, Generation Victoria, National Electricity, and Electricity Services Victoria, responsible for generation, transmission, and distribution respectively. These businesses commenced full operations from January 1994.

Second stage: introduction of competition

The next stage was the creation of a competitive market structure that demanded further restructuring. The generation sector was disaggregated into five competing companies. The distribution and retail sectors were aggregated into five companies, each operating as a ring-fenced distribution monopoly and competitive retailer, which were progressively sold during 1995.

Figure 1 shows the current electricity supply industry in Victoria.

Wholesale market for electricity

The wholesale market for electricity is a set of rules and procedures managed by the VPX (Victorian Power Exchange), in conjunction with generators, customers, and network service providers, to centrally operate the power system.

In this market, the generators are paid for the electricity they sell to the pool and the market customers pay for the electricity consumed. All the electricity sales and purchases from the spot market are based on the spot price.

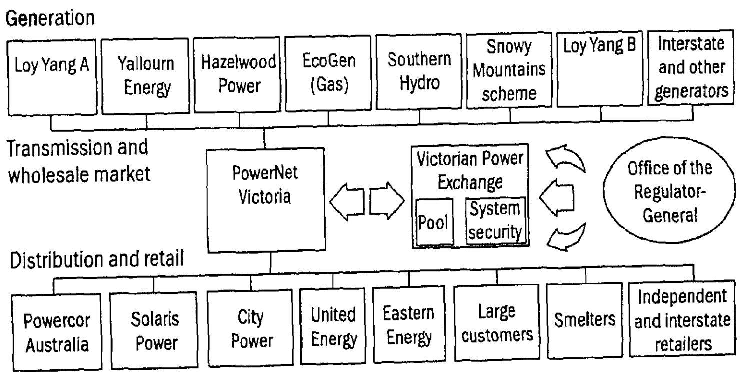


Figure 1 Structure of the Victorian electricity supply industry

Separation of transmission and system control

In October 1994, two corporate entities – VPX and the PNV (PowerNet Victoria) – were formed to facilitate the creation of a wholesale market. The PNV owns and maintains the existing network assets. The VPX is responsible for the administration of the Victorian wholesale electricity market and system security.

Under the national electricity market, which started in December 1998, many functions of the VPX and responsibilities have been transferred to the NEMMCO (National Electricity Market Management Company).

The VPX board is responsible for managing system security in Victoria. It has the appropriate powers vested in it by the Electricity Industry Act, and delegated by the Office of the Regulator-General (hereafter, the Office), to secure the power system to ensure a reliable supply of electricity to all Victorian consumers.

A core requirement of the government's reforms is that the system security standards not be compromised. The PNV owns and maintains the existing network assets. The corporation's core function is to ensure that its assets are adequately maintained and plant performance meets the required standards. The PNV also aims to achieve optimal performance of its assets.

The spot market for electricity

The principal functions of the spot market, or the pool, are to facilitate supply; determine the time-based price for electricity; and allow market forces rather than central planning to determine the amount, mix, and cost characteristics of generating plants, and the level and shape of demand.

It provides economic price signals to generators, customers, and network service providers to assist the evaluation of alternative investment options for new generation, demand side management, and network augmentation with greatly reduced levels of government interference.

The spot price is the time-weighted average of all five-minute dispatch prices in each thirty-minute trading interval. Each participant will view different spot prices adjusted to reflect the losses associated with transmitting electricity. The minimum spot price is zero, whereas the maximum price can be no greater than the VoLL (value of lost load), which is currently set at $5000 per MWh.

A detailed explanation of 'how the market works' as outlined in the Office's Regulatory Statement is given in Annex 1.

Generation

Before the government's reform programme began, the SECV was responsible for the majority of electricity generation in

Victoria (Annex 2). On 31 January 1995, Generation Victoria was disaggregated into five independent and commercially viable generating businesses, with the SECV retaining the government's interests in Loy Yang B and the Snowy Mountains hydroelectric scheme. Figure 2 shows the major brown coal- and gas-fired generating stations.

At the time of disaggregation, each generator was 'vested' with a fixed price contract to cover for the 'maximum uniform tariff' for non-contestable customers. This contract, called the vesting contract, provided a transition for the generators to the competitive wholesale market.

As a direct result from competition for market share in the wholesale market, Victoria has seen exceptionally low prices in the last couple of years. The average price per megawatt-hour of electricity has fallen from around $45 in 1994/95 to $14.57 in 1997/98.

Distribution and retail

Electricity distribution businesses are considered to have two components – the provision of a network (substations and wires) through which electricity may flow, and the retail sale of electricity, which includes billing and collection.

Distribution function

Each distribution business owns and manages the distribution network in the geographic area defined by its distribution licence. In general, the distribution businesses own and

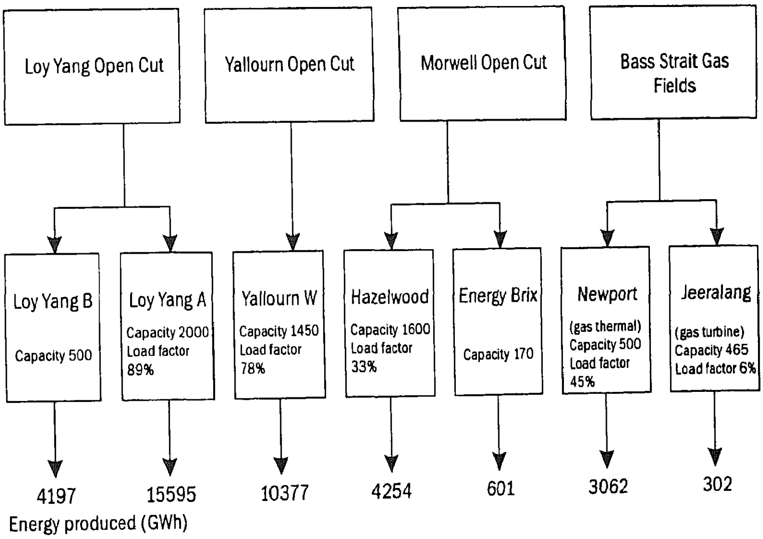


Figure 2 Major brown coal- and gas-fired generators
Source Department of Treasury and Finance

manage the network from the 66 kV circuit breaker in terminal stations down to and including the customer meter.

In addition, the distribution businesses provide a range of field and technical services which include construction of substations and high and low ground voltage lines (overhead and underground); erection of services to customer premises and installation of meters; regular inspection, testing, and maintenance of equipment; and erection and maintenance of street lighting.

The distribution function obtains income by collecting regulated connection and distribution network charges. The distribution function is expected to generate the bulk of the profits for each distribution business. The network charges are set to recover operating cost, capital costs, as well as a return on assets.

Retail function

The principal retail function of the distribution businesses is to buy and sell electricity. The industry defines customers in the Victorian retail market as either 'contestable', meaning customers can choose their supplier from the various licensed retailers operating in the market, or 'franchise', which means customers are currently unable to choose their supplier. The market is becoming increasingly contestable as groups of customers, defined by the size of their demand, follow a legislated timetable of deregulation into the competitive market (Annex 3).

Each distribution business is the sole retailer of electricity to franchise customers in a defined franchise area until those customers are able to choose retailers. The retail arm of a distribution business competes with other retailers (distribution businesses and independent retailers) to supply electricity to customers in the competitive market; provides other energy-related services to customers; and buys energy through the wholesale electricity market to supply its customers.

Electricity distribution in Victoria is carried out currently by five businesses, each of which has a regulated, monopoly distribution network and a retail arm facing competition from other retailers. The Office also has granted new retail licences to 18 participants.

Open access

There is open access to the high voltage grid and the low voltage networks. Open access means that an independent retailer may compete with the distribution companies' retail arms to supply contestable customers. Use of the distribution network is on an open access, common 'network tariff' basis. A retailer may buy electricity in the wholesale market and have it delivered across a distribution company's network under the same regulated network tariff at which the distribution company charges its retail arm for delivering electricity to its customers. A generator acting as a retailer also has the same access rights. So does a large non-franchise customer, who might want to deal directly with a generator or trade in the wholesale market.

One distribution company also has open access to another distribution company's network. That is, a distribution company is not permitted to exploit its monopoly over its network. It must allow others to use its network at network tariffs regulated by the Tariff Order and administered by the Office.

In summary, there are two components of a non-franchise customer's purchase of electricity (1) a delivery (or transport) component, which is charged at a regulated maximum rate; and (2) an electricity (or energy) component, the price of which is negotiated between the non-franchise customer and its retailer and which is not subject to regulation.

A simplified representation of the open access concept is given in Figure 3.

Customer choice

By January 2001, when competition is extended to every household, all domestic customers will be able to purchase electricity from the retailer of their choice. This is similar to the telecommunications industry where customers can choose any telephone company, which will utilize the same telephone wires but compete for customers and business by offering different packages of service and price. Customer choice in a

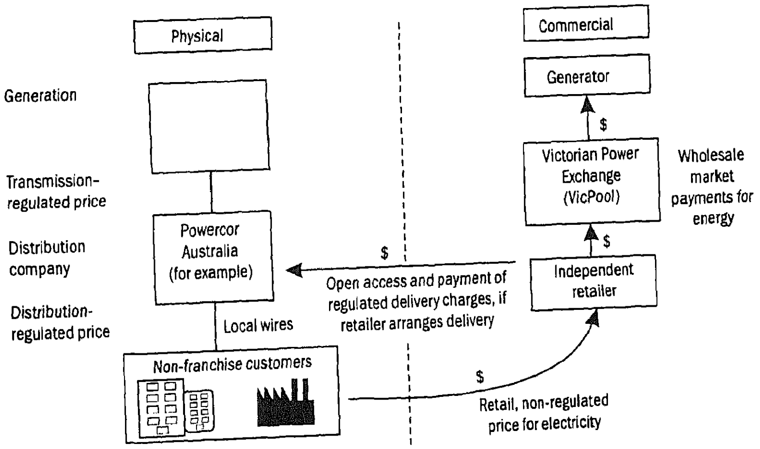

Physical
Commercial
Generation
Generator
$
Transmission-regulated price
Victorian Power Exchange (VicPool)
Wholesale market payments for energy
$
Distribution company
Powercor Australia (for example)
$
Open access and payment of regulated delivery charges, if retailer arranges delivery
Independent retailer
Distribution-regulated price
Local wires
Non-franchise customers
$
Retail, non-regulated price for electricity

Figure 3 Open access (simplified)

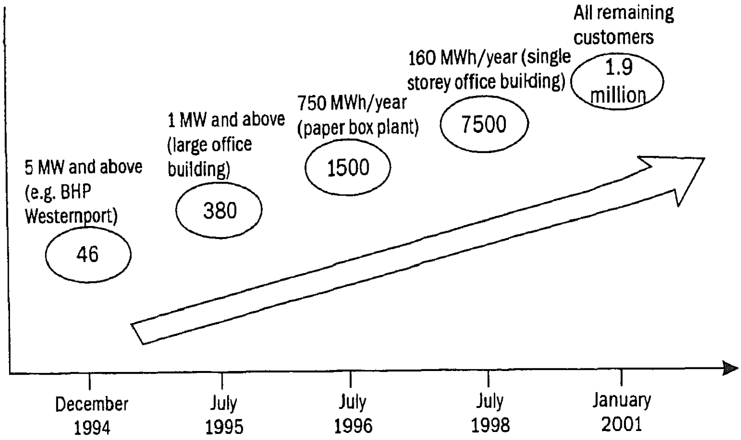

All remaining customers
1.9 million
160 MWh/year (single storey office building)
7500
750 MWh/year (paper box plant)
1500
1 MW and above (large office building)
380
5 MW and above (e.g. BHP Westernport)
46
December 1994
July 1995
July 1996
July 1998
January 2001

Figure 4 Timetable for customer choice

deregulated electricity market is being introduced progressively as shown in Figure 4.

Benefits of a competitive industry

While the contestable customers have achieved huge price reductions by shopping around for their electricity, the non-contestable or franchise customers were given guaranteed price reduction through legislation.

Residential and rural domestic customers

Prices for residential and rural domestic customers were frozen from July 1993 to 30 June 1996, representing a reduction in real terms of around nine per cent since November 1992.

Small and medium businesses

In real terms, for small and medium businesses, electricity tariffs are likely to be about 25% lower in December 2000 than in July 1993.

Price reductions until year 2000

The legislated price reductions from July 1996 until December 2000 will result in an overall real price reduction of 13% based on May 1997, CPI (consumer price index) forecasts. Details of the real price reductions are shown in Table 1.

Existing residential tariff structures are preserved through to 31 December 2000 to ensure that rural and farm customers will not be disadvantaged. Rural customers will continue to receive a cross-subsidy on their electricity usage following the year 2000.

Table 1 Real price reductions (1 July 1995–1 January 2001)

	Domestic	Small commercial
1 July 1995	No change	CPI minus 10%
1 July 1996	CPI minus 2%	CPI minus 5%
1 July 1997	CPI minus 1%	CPI minus 5%
1 July 1998	CPI minus 1%	CPI minus 1%
1 July 1999	CPI minus 1%	CPI minus 1%
1 July 2000	CPI minus 1%	CPI minus 1%
1 January 2001	Customer choice	Customer choice

The state government has built in ongoing cross-subsidies for country users in the reformed electricity industry which will last for decades. This is consistent with government policy to ensure there is little difference in price between customers in metropolitan and rural areas.

Third stage: privatization

The options of trade sales, public floats, or a combination of both were considered as part of the sale strategy (Annex 4). Given the success of the first trade sale, United Energy, the government used the same approach for subsequent sales. In each case, however, it continued to keep open the option of a full or partial float until it was clear that a trade sale would produce the best outcome for Victorian taxpayers.

Foreign ownership

Australia's financial markets are not sufficiently diverse or large enough to absorb the sale of all electricity industry assets while maximizing sale proceeds. As a result foreign ownership was an important element in the privatization strategy. Foreign ownership has maximized value from the sale of the restructured sectors of the industry. It has also brought welcome international expertise and experience in the utilities sector to the operations of the distribution businesses and those generators already privatized.

To date, cash sale proceeds of approximately 18 billion dollars have been applied to reduce state debt by approximately 17 billion dollars; pay local councils for municipal electricity undertakings – approximately 0.5 billion dollars; and provide liquidity for the SECV – approximately 0.5 billion dollars. In addition the state's obligations and exposures in relation to various power stations have been reduced by approximately $2 billion. Savings arising from debt retirement are estimated to exceed the dividends and other revenue foregone by the state by 606 million dollars in 1996/97 and 718 million dollars in 1997/98.

Experience of contestable customers

Already, large industrial and business customers who are able to choose their supplier are achieving substantial savings on their electricity bills. A recent business survey of more than 300 Victorian businesses by the Australian Chamber of Manufactures showed 80% of these customers were saving between 10% and 40% on their energy costs. Further savings will flow through to all customers as Victoria moves towards a fully competitive market in the year 2000.

Regulation

The Office of the Regulator-General was established as an economic regulator on 1 July 1994 under the Office of the Regulator-General Act 1994 (hereafter, the Act).

Framework

The regulatory framework provided for the Victorian electricity industry is essentially light handed (Annex 5). The Electricity Regulatory Statement states

> - *provide an unambiguous framework which maximises the scope for commercially negotiated outcomes;*
> - *avoid placing onerous restrictions or reporting requirements on market participants; and*
> - *include effective reserve powers to protect customers and correct uncompetitive market behaviour.*
>
> *That is, as far as reasonably practicable, the regulatory framework encourages industry participants and their customers to negotiate commercial outcomes with intervention by the Office of the Regulator-General (the Office) only where it is necessary to correct misuse or abuse of market power in the interests of competition or customers.*

The Office regularly monitors price and service levels. While the Office of Energy Industry Ombudsman addresses day-to-day customer issues, systemic complaints are handled by the Office.

The Regulator-General

The Office consists of one member appointed as the Regulator-General on the basis of his or her knowledge of, or experience in, one or more of the fields of industry, commerce, economics, law, or public administration, usually for a five-year term.

Independence

The thrust of the regulatory framework is that the Office is independent of the government of the day.

The role of the government of the day is to decide policy issues such as the appropriate structural and regulatory framework. The role of the regulator is to administer the policy decided by the government of the day.

The Act provides that the Regulator-General may be suspended from office by the Governor in Council, but must not be removed from office except in accordance with that Act.

The Office's objectives

In performing its functions and exercising its powers the Office has the following objectives.

- Promote competitive market conduct
- Prevent misuse of monopoly or market power
- Facilitate entry into the relevant market
- Facilitate efficiency in regulated industries
- Ensure that users and consumers benefit from competition and efficiency
  (See Section 7[1] of the Office of the Regulator-General Act 1994.)

The objectives of the Office under the Electricity Industry Act 1993 are to

- promote competition in the generation, supply, and sale of electricity
- ensure the maintenance of an efficient and economic system for the generation, transmission, distribution, supply, and sale of electricity
- protect the interests of consumers with respect to electricity prices and the safety, reliability, and quality of electricity supply
- facilitate the maintenance of a financially viable electricity supply industry.
  (See Section 157 of the Electricity Industry Act 1993.)

It is legislated that in the case of a conflict between objectives, the Office must perform its functions and exercise its powers in a manner it considers best achieves the objectives in the Electricity Industry Act 1993.

Community service obligations

The dichotomy between the role of the government and the role of the Office means that it is for the government, not the Office, to decide social policy and the scope and funding of any community service obligations. That is, to the extent that there is a case for assistance to customers with special needs, it is not for the Office to decide who is eligible or how much they should receive; that is a matter for the government of the day, the Office has no mandate in that regard.

Price regulation

The Office regulates prices in respect of tariffs for the sale of electricity to franchise customers (until 31 December 2000); charges for connection to, and the use of, any distribution system; and charges for connection to, and the use of, the transmission system.

Other regulatory powers

Section 26 of the Office of the Regulator-General Act 1994 provides that the Office may exercise such powers (including the power to make determinations) for or with respect to standards and conditions of service and supply, licensing, market conduct, and other economic regulatory matters. The Electricity Industry Act 1993 empowers the Office to issue licences that include conditions which require the licensees to observe standards and conditions of service and supply and which enable the Office to regulate the licensees' market conduct.

Enforcement powers

If a licensee is contravening, or is likely to contravene, a condition of a licence and the Office considers the contravention is not of a trivial nature, the Office may issue a provisional or final order requiring the licensee to comply with the condition. Failure to comply with such an order exposes the licensee to a penalty of $100 000 and $10 000 for each day of the contravention. The Office also has the same power in respect of a breach of a determination made by it and the same penalties apply.

Power to obtain information

The Office has the power to obtain information by way of licence conditions and also from those appearing before it at an inquiry. If the Office has reason to believe that a person has information or a document that may assist the Office in the performance of its functions, it may request the person to give it the information or a copy of the document. A person who without lawful excuse fails to comply with a request made under Section 27A or knowingly gives the Office information that is false or misleading is liable to a penalty of $10 000 or imprisonment for two years.

New price controls

The Office from time to time has to review and decide on new price controls for the regulated businesses. The Office is currently working on the development of the new price controls for the electricity distribution use of system charges for the years 2001–2005. The principle objective of the Office in undertaking the review is to ensure that it delivers sustained incentive for the distribution companies to increase their efficiency and reduce cost, while maintaining and improving the quality and reliability of supply.

Endnote

This paper draws on *2001 Electricity Distribution price review framework and approach*, Office of the Regulator-General, June 1998; *Australia's National Electricity Market – An introduction,* NEMMCO November 1997; *Annual Report*, Electricity Services Victoria, June 1994; *Annual Report*, State Electricity Commission of Victoria, 1990/91, 1992/93; *Annual Report*, Office of the Regulator-General, Victoria, 1997/98; *Electricity Industry Regulatory Statement*, Office of the Regulator-General; *Hazelwood has pricing worry*, article in the Melbourne AGE, 25 January 1999; *SECuring the Future – Labor's policy for your SEC*, Australia Labor Party, 1994; Victorian Electricity Supply Industry Tariff Order, Order in Council under section 158A of the Electricity Industry Act, 1993; *Victoria's Electricity Supply Industry – Towards 2000*, Energy Projects Division, Department of Treasury and Finance, June 1997; and the Internet homepage of the Office of the Regulator-General at http://www.reggen.vic.gov.au.

Annex 1

Commercial relationships

The commercial relationships between franchise and contestable segments of each distribution business and other industry participants are illustrated below.

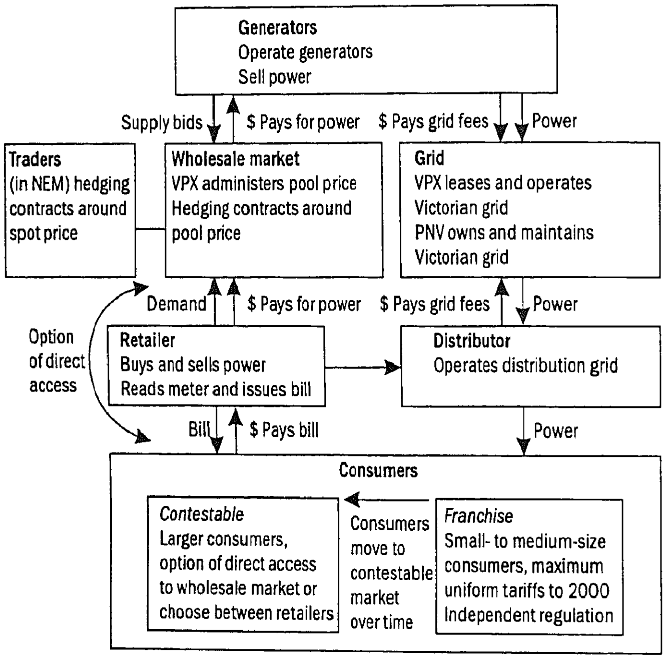

Generators
Operate generators
Sell power
Supply bids
$ Pays for power
$ Pays grid fees
Power
Traders
(in NEM) hedging contracts around spot price
Wholesale market
VPX administers pool price
Hedging contracts around pool price
Grid
VPX leases and operates Victorian grid
PNV owns and maintains Victorian grid
Demand
$ Pays for power
$ Pays grid fees
Power
Option of direct access
Retailer
Buys and sells power
Reads meter and issues bill
Distributor
Operates distribution grid
Bill
$ Pays bill
Power
Consumers
Contestable
Larger consumers, option of direct access to wholesale market or choose between retailers
Consumers move to contestable market over time
Franchise
Small- to medium-size consumers, maximum uniform tariffs to 2000
Independent regulation

Figure 1 How competition grows

How competition works

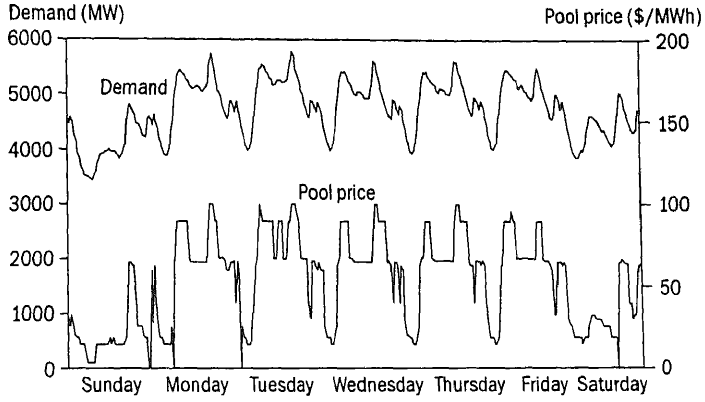
Many functions of the VPX (Victorian Power Exchange) will become the responsibility of NEMMCO in the national market.

VicPool

The VPX manages VicPool or Victoria's wholesale electricity market, where VicPool sets a spot price for electricity traded between the generators and distribution companies. The VPX has the authority to approve independent retailers, other generators, and non-franchise customers to become pool members so that they may trade in this market.

The spot or pool price for electricity is set on a half-hourly basis and can fluctuate as shown in Box 1 depending on system demand, bid prices, availability of generation and transmission, and weather conditions. To protect themselves against such fluctuations, companies trading through VicPool typically enter hedging contracts.

Box 1 Actual pool price and system demand (28 May 1995 [Sunday] to 3 June 1995 [Saturday])



The pool prices shown in Box 1 were higher than the average expected price for the period because

- some units of a generator were not running in that particular week
- demand was higher than average due to cold weather conditions.

The VPX estimates likely demand for electricity for the days ahead based on weather forecasts, previous consumption patterns, and other relevant criteria.

The Pool Rules of the time had the following provisions.

- Every Wednesday, each generator submits an offer or bid to the VPX for the various amounts of energy it is prepared to deliver to the market each half hour to meet the estimated demand and the prices at which it is prepared to deliver those amounts for the following Sunday to Saturday.
- Based on using energy from the lowest bidder first, the VPX schedules the generators to meet the estimated demand and reserve requirements over the relevant period.
- The more efficient generators, which are able to offer the most competitive prices, are therefore likely to sell more electricity than less efficient producers.
- Each day the VPX produces a forecast pool price for the next day, based on the estimated demand and the generators' bids. The forecast pool price for the day ahead is issued by 4 p.m. each day. VicPool customers therefore know when the pool price is expected to be high and if they have the ability to control their use of electricity, they may

choose to shift some of their use from high price periods to lower price periods.

Subsequently, Pool Rules have been amended to allow for daily rather than weekly bidding and generator self commitment.

Determining the pool price

VicPool is a marginal price market. This means that the pool price is intended to reflect the marginal value of electricity. It is based on the highest priced generator's bid used to balance supply and demand in each half hour. Bids from generators are accepted by VicPool to balance supply and demand in increasing price order. The half hourly pool price is determined after the event and is set at the price of the highest bid accepted in the half hour. This is known as the system marginal price or pool price.

All wholesale electricity is traded through VicPool at the pool price. All generators are paid the pool price (not their bid price) for the energy they supply. As any generator may set the pool price, a generator would not normally bid below its operating cost.

In an ideal market, a generator may be expected to structure its bids so that it covers, on average, the operating costs plus its fixed costs. This will generally be achieved by payment over time of pool prices which will provide each generator its operating cost at all times and a varying contribution to fixed costs at times when higher price generators are setting the pool price. Peaking and emergency plants are, however, likely to bid higher than their operating costs to earn sufficient revenue to remain viable.

Large brown coal units take many hours to start up and cannot be rapidly stopped and restarted. These units also have a minimum operating level. They are often retained on line at a minimal operating level overnight. At times this can result in zero bids. Any unit operating at minimal level is, however, excluded from setting pool prices as it is not marginal. Zero pool prices may, however, occur when the marginal generator's bid is zero, e.g., in circumstances where it is running at close to its minimum level. Prices can rise rapidly when an unplanned reduction in availability of a large low-priced unit requires a higher-priced reserve unit to be used.

Managing fluctuating pool prices

At its simplest, the wholesale electricity market works on supply and demand. In principle, the wholesale price of electricity is cheaper when demand is low and higher when demand is greatest.

Like prices in other wholesale commodity markets, the wholesale price of electricity, or the pool price, fluctuates as shown in Box 2 with regard to supply and demand factors and, in particular, weather conditions.

Accordingly, a prudent purchaser enters into hedging contracts with generators to reduce the risk of exposure to fluctuating pool prices.

Because trading in VicPool involves some risk compared to purchasing through a retailer, the option of participating in VicPool may appeal only to relatively large customers, such as a major industrial user of electricity.

There may, however, also be advantages in wholesale purchasing where

- a customer is able to closely control its production process and schedule the process to take advantage of the half hourly changes in price in the wholesale electricity market or
- a customer with a significant load is able to negotiate advantageous terms with a generator by direct dealing.

As in other commodity markets, customers who enter the wholesale electricity market may seek to manage the risk of price fluctuations in the spot market by entering into hedging contracts.

The National Electricity Market allows interstate generators and retailers to trade their electricity through a national market on a basis similar to that in Victoria.

Contracts and the wholesale market

Because electricity generation is a capital-intensive industry with long-lived assets, a generator may seek to ensure its cash flow by entering into long-term contracts to minimize the financial risks that are inherent in fluctuating pool prices.

In turn, a buyer, such as a retailer or a customer who participates in VicPool, may seek price stability by entering a long-term contract with a generator or generators.

A customer interested in participating in VicPool will need to be familiar with the operation of such contracts and their interaction with the spot market.

As these contracts provide a hedge against the financial risks inherent in fluctuating pool prices, they are sometimes known as hedging contracts. There are two main types of hedging contracts – a two-way hedge and a one-way hedge. The nature of these hedging contracts is described below.

Two-way hedge

A two-way hedging contract will fix the price of an amount of electricity for both the buyer and seller.

- When the pool price rises above an agreed strike price, the seller pays the buyer the difference.
- When the pool price goes below the strike price, the buyer pays the seller the difference.

With a two-way hedging contract, the contract quantity and strike price may be different for different time periods and for different days of the week.

Box 2 Example of a two-way hedge

A customer buys a two-way hedging contract for 1 MW of electricity at a strike price of $70 per MWh for weekdays between 2 and 6 p.m. for the month of May. When the pool price on any May weekday between 2 and 6 p.m. is above the strike price of $70 (at, say, $90), the seller will pay $20 per hour to the customer, being the difference between $90 (the pool price) and $70 (the strike price).

When the pool price falls below the strike price of $70 to, say, $65, the buyer will pay the seller $5 per hour, being the difference between the strike price and the low pool price.

The above example is illustrated in Box 3 which magnifies the pool prices shown in Box 1 capped by the two-way hedge.

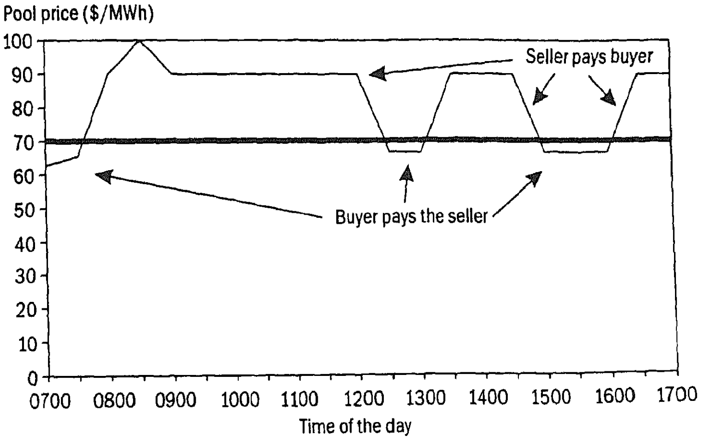
As both parties benefit from a two-way hedging contract, generally no option fee is charged. An option fee may, however, be charged depending on the strike price.

Box 3 magnifies the 'cap' for Tuesday, 30 May as shown in Box 1. At 8.30 a.m. when the pool price is $100 per MWh, the seller of the hedging contract pays the buyer $30 per hour being the difference between $100 (pool price at the time) and the $70 (strike price) for the hedge load of 1 MW. Conversely, between 3.00 p.m. and 4.00 p.m. when the pool price is $65, the buyer pays the seller $5 for each of those hours, being the difference between the $70 strike price and the $65 pool price.

One-way hedge

A one-way hedging contract (Box 4) sets a price cap or strike price for an amount of electricity – the contract quantity. A buyer pays the seller a fixed option fee. When the pool price goes above an agreed amount – the strike price – the seller

Box 3 Pool price and a two-way hedge



Box 4 Example of a one-way hedge

A customer with a 1.3-MW maximum demand buys a one-way hedging contract for 1 MW of electricity at a strike price of $80 per MWh, for weekdays between 9 a.m. and 5 p.m. and, say, an option fee of $500 per month.

Every time the pool price (say, $95 at a particular hour) is above the strike price ($80 in this case), the seller will pay the customer $15 for that hour – being the difference between the pool price and the strike price. To have this protection as an insurance against a rise in the pool price, the customer pays the option fee (like an insurance premium) of $1500 each month.

While the $1500 option fee may increase the customer's bill by, say, on average $2 per MWh, it ensures that the customer will not pay more than the strike price ($80 per MW) irrespective of the pool price, which may be much higher than the strike price.

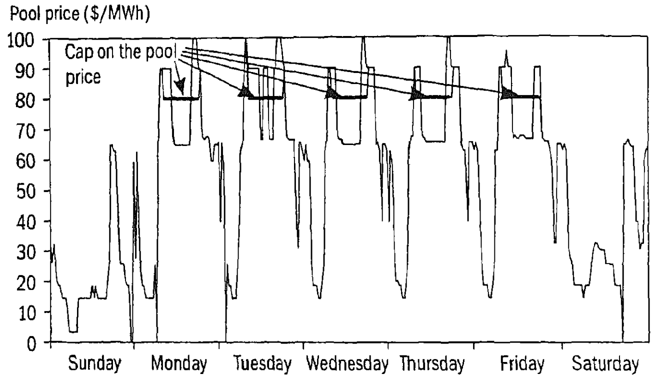
The strike price and option fee are negotiable as between the parties - the higher the strike price, the lower the option fee and vice versa.

The above example is illustrated in Box 5 which magnifies the pool price as capped by the one-way hedge.

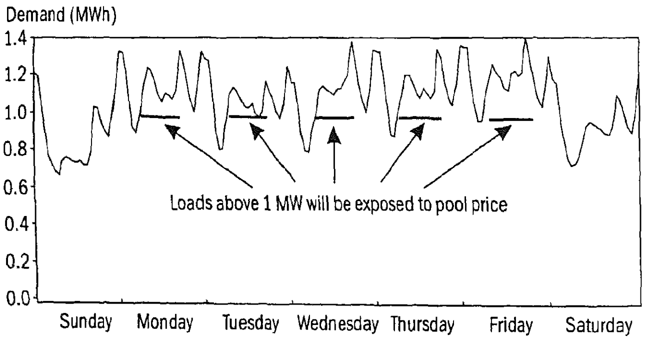
pays the buyer the difference between the pool price and the strike price for the contracted quantity.

A one-way hedging arrangement puts a cap on a customer's exposure. On all the five weekdays, the pool prices are above the strike price ($80/MWh). Since the hedging agreement is for 1 MW only, loads above 1 MW mark are exposed to pool price fluctuations as shown in Box 6. The customer or the

Box 5 Exposure capped by the one-way hedge (28 May 1995 [Sunday] to 3 June 1995 [Saturday])



Box 6 1 MW plus customer demand curve (Sunday to Saturday)



buyer of the one-way hedge will receive payment from the seller for each of the hours when the pool price is above the $80 strike price. When the pool price is below the $80 strike price the buyer need not pay anything to the seller, the buyer keeps the benefit of the lower pool price. The cash flow is one way only – the seller pays the buyer when pool price is more than $80.

The customer has to evaluate the probability of receiving these payments (when the pool price is above the strike price) and compare the total expected gain against the monthly option fee paid to the seller of the hedging contract.

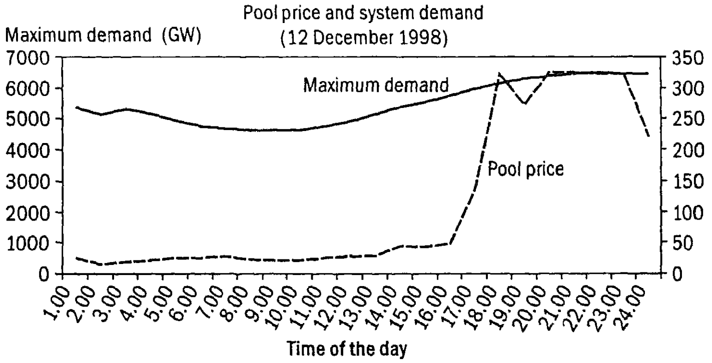
Use of a hedging contract means that the effective future purchase or sale price (for a given volume of electricity at a given time) may be known with some certainty for the period of the contract.

Box 6 shows the demand curve of the customer used in the example in Box 4 over a week. The demand varies with the time of day. The maximum for the week is 1.3 MW. To minimize its exposure to the pool price, the customer has bought a cover of 1 MW only which is less than its actual maximum demand of 1.3 MW. Since a hedging contract has its own costs, the customer has to decide the level of exposure it wants, taking into consideration the trade-offs between an exposure to pool price for loads beyond 1 MW and the extra cost of hedging that exposure. That is, the optimal level of hedging contracts never completely eliminates pool price exposures and a residual risk is always left with the customer because of the fluctuations that are inherent in pool prices and their demand.

The future industry provisions of the Corporations Law may apply to hedging contracts.

The above example was written in 1995 with an average expected pool price in the vicinity of $45 per MWh in mind. Box 7 is an example of recent pool price.

Box 7 Recent low pool price



Annex 2

Electricity generation in Victoria

Brown coal-fired stations

Victoria has brown coal reserves amounting to more than 42 gigatonnes, or in excess of 1300 years supply at current production levels. Three open cut brown coal mines operating in the Latrobe Valley – Yallourn, Loy Yang, and Morwell – together produce approximately 50 million tonnes of brown coal annually. The mines are operated by the three largest brown coal-fired power stations – Yallourn W, Hazelwood, and Loy Yang A. The Loy Yang mine that supplies Loy Yang A and B produces more coal than any other single mine in Australia.

Table 1 summarizes the generation capacities of Victoria's major power stations, plus other Victorian entitlements.

Table 1 Generation capacities of Victoria's power stations

Power station	Nameplate rating (MW)	Installed plant (MW)	Energy generated (GWh)	Capacity factor (%)
Brown coal-fired				
Loy Yang A	2000	4 x 500	15595	89
Hazelwood	1600	8 x 200	4254	30
Yallourn W	1450	2 x 350 2 x 375	10377	82
Loy Yang B (3)	1000	2 x 500	4197	96
Energy Brix	170	1 x 60 3 x 30 1 x 20	601	40
Anglesea	150	1 x 150	1030	78
Natural gas-fired				
Newport D	500	1 x 500	3062	70
Jeeralang	466	3 x 80 4 x 56.5	302	7
Hydroelectric				
Kiewa Group	184	2 x 12 4 x 15.4 6 x 18	307	19
Dartmouth	150	1 x 150	300	46
Eildon/Rubicon/ Cairn Curran	135	2 x 60 6 x 4.6 or less	77	12
Other entitlements				
Snowy	1084	Various	1319	
Hume	25		77	
Total	8414		41860	

Source Victorian Power Exchange

Annex 3

Retail competition timetables

Table 1 Victoria

Site threshold	Date of eligibility	Estimated number of eligible sites	Examples of customer type
In excess of 5 MW	December 1994	47	BHP Westernport
In excess of 1 MW and less than 5 MW	July 1995	330	Large multi-storey office building; ICI chlorine production plant
Energy demand in excess of 750 MWh/year and loads less than 1 MW	July 1996	1500	Paper box plant; small concrete plant
Energy demand in excess of 160 MWh/year and less than 750 MWh/year	July 1998	5000	Single-storey office; fast food restaurant
All remaining customers	January 2001	1957300	Individual residential user

Source Victorian Power Exchange

Table 2 Australian Capital Territory

Site threshold	Date of eligibility	Total energy (%)	Examples of customer type
In excess of 5 MW	1 October 1997	7.40	University
In excess of 1 MW and less than 5 MW	1 March 1998	18.06	Multi-storey office building; food processing plant
Energy demand in excess of 750 MWh/year and loads less than 1 MW	1 May 1998	32.18	Supermarket; engineering workshop
Energy demand in excess of 160 MWh/year and less than 750 MWh/year	1 July 1998	40.74	Fast food restaurant; bakery
Less than 160 MWh/year	1 July 1999	100.00	All remaining customers

Source Victorian Power Exchange and TransGrid

Table 3 New South Wales

Site threshold	Approximate annual power bill	Date of eligibility	Number of eligible sites	Customer type
In excess of 40 GWh/year	More than $2000000	1 October 1996	47	Large metropolitan; hospital; heavy manufacturing plant
In excess 4 GWh/year	More than $250000	1 April 1997	660	Multi-storey office building; food processing plant
In excess of 750 MWh/year	More than $75000	1 July 1997	3500	Supermarket; engineering workshop
In excess of 160 MWh/year	More than $16000	1 July 1998	10800	Bakery; fast food restaurant
Less than 160 MWh/year	Less than $16000	1 July 1999	2700000	All other New South Wales-based customers

Source Victorian Power Exchange and TransGrid

Table 4 Queensland

Site threshold	Date of eligibility
In excess of 40 GWh/year	January 1998
In excess of 4 GWh/year	January 1999
In excess of 200 MWh/year	January 2000
All remaining customers	January 2001

Source Queensland Electricity Reform Unit

Annex 4

Privatization proceeds (million dollars)

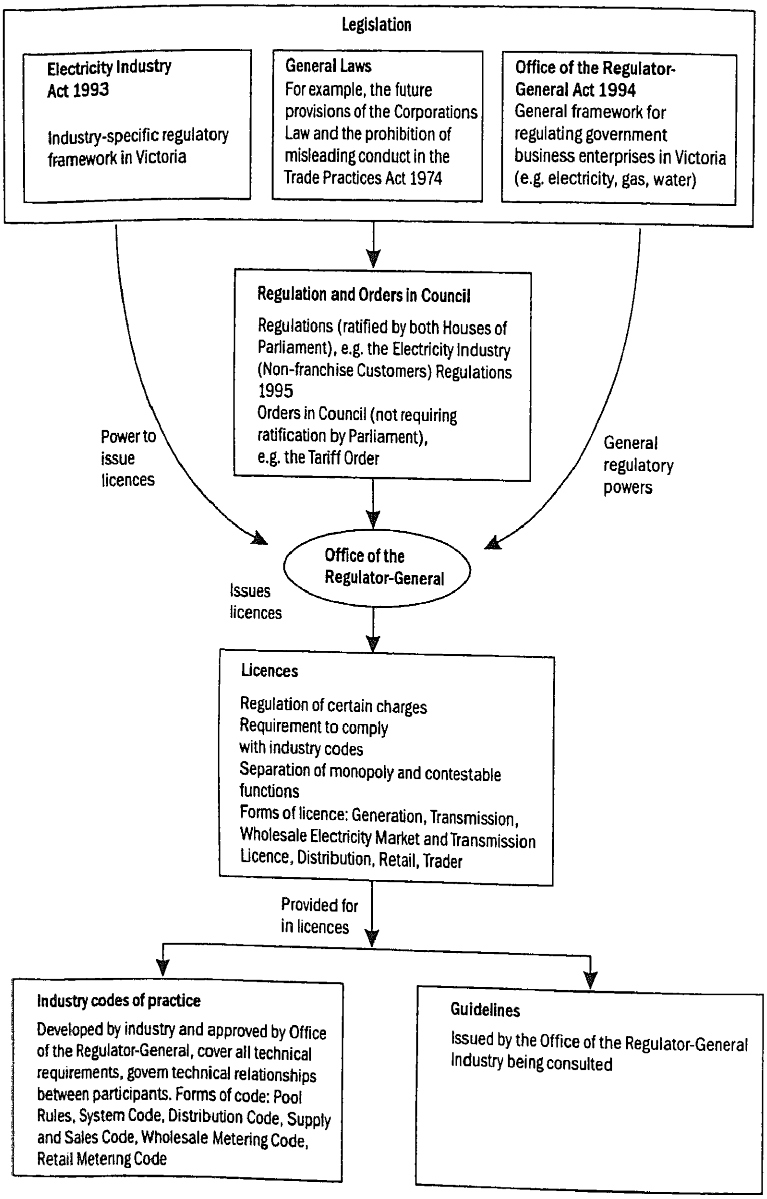
	Distribution					Generation				Total
	United Energy	Solaris Power	Eastern Energy	Powercor Australia	Citipower	Yallourn Energy	Hazelwood	Loy Yang B	Loy Yang A	
Cash proceeds	1553	950	2080	2150	1575	2426	2357	84	4746	17921
Date of sale	7 August 1995	30 October 1995	5 November 1995	16 November 1995	14 December 1995	21 May 1996	4 August 1996	1 April 1997	22 April 1997	
Purchaser details	AMP Society 40.87%; Axiom 9.23%; Utilicorp 49.9%	AGL 50%; Energy Initiatives 50%	Texas Utilities 100%	PacifiCorp 100%	Energy Corp 100%	PowerGen 49.9%; ITOCHU 10.4%; AMP Society 26%; Axiom 8%; Hastings Fund Management 5.7%	National Power 52%; Destec 20%; PacifiCorp 19.9%; Commonwealth Funds Management 6.1%; Commonwealth Bank of Australia 2%	Edison Mission Energy 100%	CMS Energy 50%; NRG Energy Inc 25%; Infrastructure Trust of Australia 11.2%; Macquarie Bank 5.6%; ANZ Securities 5.6%; UniSuper 2.6%	

Note

- The gross proceeds for the distribution companies exclude the net present value of franchise fees.
- In connection with the sale of Hazelwood Power, the government entered into a separate agreement to sell Energy Brix Australia.
  The gross proceeds represent the net proceeds to the state in this case.
- In connection with the sale of Loy Yang A, the purchasers assumed liabilities associated with the Lurgi Dried Brown Coal Plant.
- In connection with the sale of the state's interest in the Loy Yang B power station, the Edison Mission Energy Group released the state from significant liabilities and exposures associated with previous contractual arrangements and reduced the state's exposure to losses under ongoing contractual obligations to supply electricity to aluminium smelters.

Annex 5

Regulatory framework


Legislation
Electricity Industry Act 1993
Industry-specific regulatory framework in Victoria
General Laws
For example, the future provisions of the Corporations Law and the prohibition of misleading conduct in the Trade Practices Act 1974
Office of the Regulator-General Act 1994
General framework for regulating government business enterprises in Victoria (e.g. electricity, gas, water)
Regulation and Orders in Council
Regulations (ratified by both Houses of Parliament), e.g. the Electricity Industry (Non-franchise Customers) Regulations 1995
Orders in Council (not requiring ratification by Parliament), e.g. the Tariff Order
Power to issue licences
General regulatory powers
Office of the Regulator-General
Issues licences
Licences
Regulation of certain charges
Requirement to comply with industry codes
Separation of monopoly and contestable functions
Forms of licence: Generation, Transmission, Wholesale Electricity Market and Transmission Licence, Distribution, Retail, Trader
Provided for in licences
Industry codes of practice
Developed by industry and approved by Office of the Regulator-General, cover all technical requirements, govern technical relationships between participants. Forms of code: Pool Rules, System Code, Distribution Code, Supply and Sales Code, Wholesale Metering Code, Retail Metering Code
Guidelines
Issued by the Office of the Regulator-General
Industry being consulted

Massachusetts
Department of
Telecommunications
and Energy,
Boston,
USA

James Connelly

Creating a competitive electricity industry: restructuring in Massachusetts

Transition to a liberalized environment: experiences and
issues in regulation 183-186

The restructuring of the electricity industry in Massachusetts was precipitated by a 1994 service dispute between two regulated, investor-owned electricity companies – the Boston Edison Company and the Massachusetts Electric Company. These two utilities disputed over serving the load of a large commercial customer, the Boston Metropolitan Area Transit Authority, a public entity with a statutory authority to purchase electricity at wholesale. The area served by the Transit Authority straddles the monopoly franchise territories of the two electricity companies.

The dispute was brought before FERC (Federal Energy Regulatory Commission) for resolution; and the Massachusetts Utility Commission, now called the DTE (Department of Telecommunications and Energy), intervened. Electricity and gas transactions of an interstate or a wholesale character are generally regulated by FERC under federal law. Regulation of intrastate transactions at retail level is generally reserved to the public utility commissions of the 50 states. The jurisdictional line is, however, not always a bright one.

The nature of the service contract raised the issue of stranded investment. Whereas the two electric companies had formerly served only part of the Transit Authority's load in their respective service territories, the winning bidder, Boston Edison, would now serve the Transit Authority's entire load. Thus Massachusetts Electric's wholesale contract commitments to serve its lost load would be stranded.

The nature of the customer and its unique statutory authority to purchase at wholesale made the FERC case unsuitable, from DTE's point of view, to resolving the much bigger question of electricity industry restructuring, including recovery of stranded investment. In exchange for the parties settling the FERC dispute, the DTE agreed to open a generic investigation of electricity restructuring at the state level. This is a salutary example of commercial conflict forcing regulatory review and action.

Eight months later in August 1995, after intensive investigation, the DTE announced a set of principles for equitable restructuring. The DTE order announcing the principles made the seven electricity companies of Massachusetts file individual restructuring plans in 1997. These filings culminated in 1998 with DTE adjudication. Some of these filings resulted in negotiated settlements between the petitioner and interveners. The settlements were offered to the DTE for review and approval, in resolution of the investigations of the restructuring plans of the respective companies.

Because the DTE acts under delegated legislative authority, the Massachusetts legislature entered the debate. The governor filed a bill with the legislature in January 1997 to ratify what the DTE proposed to accomplish administratively. The bill was also intended to authorize the DTE to do or forbear from doing certain matters that either were not authorized or were required by statute. After 10 months of consideration, the legislature established new policies and laws to govern the restructuring effort.

The work of the legislature resulted in the Massachusetts Electric Restructuring Act, Chapter 164 of the Acts of 1997 (St.1997, c.164). The Act was passed in November 1997 and signed into law by the Massachusetts Governor, Paul Cellucci. The enactment followed the principal features of the bill the governor had sponsored earlier that year and was informed by the terms of proposed settlements of electricity restructuring filings then pending at the DTE. The settlements indicated what the actors in the marketplace found acceptable.

The Act also tracks comparable features of agreements reached between parties to the DTE adjudications of electricity company restructuring filings and settlements. The Act highlights the August 1995 principles enunciated by the DTE.

- Customer choice of competitive electric supplier by 1 March 1998.
- A 10% rate reduction by 1 March 1998, effected through the Stranded Offer Service from the electric utilities.
- A further five per cent rate reduction by 1 September 1999, after divestiture of generating plant by restructured companies and after securitization of net stranded investment costs.
- Investor-owned electricity companies have the opportunity to recover full net stranded costs after mitigation efforts are completed.
- Exemption of the approximately 40 municipal (i.e., city- or town-owned) electricity systems from competition by competitive generators, provided the municipal electric system does not sell outside its service territory.

- Preservation of low-income rate subsidies.
- Increased funding for energy-efficiency measures.
- Increased funding for renewable energy sources.
- Streamlining of energy facility siting to accommodate market competition in electric generation.
- Opportunity for aggregation of customer load by marketers, brokers, municipal governments, and cooperative groups to accord purchasing power to smaller load customers.
- Provision of a discount to farm operations.
- Funding for consumer education to facilitate choice of electric supplier.
- Restructuring of the state utility commission.

During 1998, the DTE work was conducted against a background of possible popular repeal of the Act itself. Under the Massachusetts Constitution, certain acts of the legislature are subject to potential repeal by popular referendum, if sufficient signatures supporting a repeal proposition are gathered and certified to put the question of repeal on the ballot. The voting populace turned aside this challenge to electricity restructuring, when the referendum question was resoundingly rejected in the November 1998 election. Even so, the DTE had to work most of 1998 in a climate of uncertainty.

Since the 1994 dispute over the electricity load of the Boston Transit Authority, much change has been accomplished, but more remains to be done. Fortunately, the governor has placed the governance of the DTE in the hands of a philosophically coherent commission rather than a debating society. Shared and coherent purpose has made it possible to keep up the challenging pace demanded by the Act.

As of early 1999, the DTE has fully approved the restructuring plans for six of its seven investor-owned electricity companies and has the one remaining plan under investigation for final action. In addition, the DTE, as required by the Act, issued new regulations governing information disclosure, competitive supplier licensing, and model terms and conditions for the distribution companies that will remain once the electricity companies have divested themselves of all generating assets.

In view of the developing convergence of former monopoly enterprises (e.g., electricity companies now may provide an array of services in addition to electricity such as telephone, cable television, and Internet access), the DTE also issued standards of market conduct governing the relationship between energy companies and non-energy affiliates. These standards are designed to protect captive customers and other market participants from burdens of cross-subsidization, while allowing electricity distribution companies to achieve the benefits of increased efficiency through economies of scope and provide customers with the same.

In parallel with these efforts, the DTE has approved the generating-plant divestiture transactions by its jurisdictional electricity companies. In early 1999, DTE will complete its action on the two remaining generation-divestiture proposals, including what could be the first approval of a sale of a nuclear power plant by a state-regulated electricity company to a competitive power producer (Boston Edison's Pilgrim Nuclear Power Station to Entergy). All divestiture sales approved so far have achieved prices at a premium above the book value of the assets – in the range of 1.2 times to more than 6 times the book value, depending on the company.

Further important actions that are required of the DTE before 1 January 2000 are listed below.

- Conduct comprehensive audits of claims of stranded investment made by the electricity companies.
- Assess power purchase contracts to determine whether they are above-market and whether efforts have been made in good faith to renegotiate contract terms and prices.
- Approve securitization of stranded costs after divestiture, renegotiation, and other mitigation efforts have been investigated and audited.
- Study the feasibility of competitive metering, billing, and information services.
- Certify municipal load aggregation plans.
- Approve performance-based rate plants based on service quality indicators.

Public Utilities Authority - Electricity, Israel

Chaim Elata, David Assous, and Moshe Tsur

Tariff setting for power: the Israeli experience

Transition to a liberalized environment: experiences and issues in regulation 187-197

Introduction

Regulation of natural monopolies by government agencies is an accepted practice in most western countries, and has recently spread to many other countries around the world. The main function of the regulating agency is to preserve the balance between the interests of consumers and those of the service providers in the economic environment in which monopolies operate.

The onset of the energy crisis precipitated a period in which the economic conditions for electricity services in the world changed drastically. Fuel prices and interest rates fluctuated wildly and the cost of power plant construction escalated. During this period, regulation involved the complicated tasks of evaluating investment costs by the criteria of 'used, useful, and prudent'. The rates were frequently updated and were linked to fuel cost and the inflation that led to their escalation. In an attempt to increase efficiency and control costs, new concepts in regulation were proposed, such as 'incentive regulation' and 'price and revenue caps'. The so-called CPI-x (consumer price index-x) method applied an efficiency factor to the overall rate. Presently, various methods are utilized by agencies as the basis for their regulation systems.

The establishment of the PUA (Public Utilities Authority - Electricity) as an independent regulatory authority in 1996 constituted an innovation in the area of public utility service in Israel. As the first PUA in Israel, it was necessary to develop a model that would be compatible with local conditions. It was also important to increase the awareness of the existence of, and the crucial need for, independent regulatory agencies and their expansion into other sectors of public service.

According to the Electricity Industry Law of March 1996, the PUA has been granted exclusive powers in two major areas. The first is the periodic setting of the electricity base rate. The second is the determination of tariffs, taking into account standards, nature, and quality of the service provided.

Israel's electricity industry

The electricity industry in Israel constitutes approximately 2.4% of the country's gross national product. Most of the economic operations in this sector are carried out by the IEC (Israel Electric Corporation Ltd), while other entities – the East Jerusalem Electric Corporation and IPPs (independent power producers) – play minor roles.

The Israel Electric Corporation

According to the Israel Electricity Industry Law, the IEC at present holds licences for the production, distribution, supply, and sale of electricity. These all-encompassing licences are valid until March 2006. The structure of the IEC can be divided into three sections.

Production

The production system covers the generation of electricity, which includes the various power stations. Some of the basic characteristics of the production system for 1997 are presented in Table 1.

There has been a significant increase in the generation of electricity in Israel, an average of 6.5% per year since 1987. The introduction in 1991/92 and 1995/96 of new coal-based electricity generating units affected the ratio of electricity production between the various units. This change also affected the basket of fuels consumed in electricity production. Between 1986 and 1996, the consumption of coal in electricity production increased by 142%, while the consumption of crude oil increased by only 28%.

Transmission

The transmission system is responsible for synchronizing the generation units and delivering the produced power to the consumer distribution grids. The system includes the power lines for extra-high voltage of 110 kV (187 km) and 161 kV (2300 km), and for ultra-high voltage of 400 kV (173 km). It also includes the switching stations that receive electricity from the power stations, as well as the load control system.

Table 1 Annual generating capacity and production by fuel type for 1997

Fuel type	Installed capacity (MW)	Total installed capacity (%)	Million kWh generated in 1997	Total production (%)
Coal (steam units)	3700	47	24781	74
Fuel oil (steam units)	2200	28	8467	25
Gas oil (gas turbines)	1954	25	359	1
Total	7854	100	33607	100

Table 2 Distribution of customers and their rate of consumption

Type	Customers (%)	Consumption (%)
Domestic	88.4	30.9
Industrial	1.5	26.3
Commercial	9.4	30.6
Agriculture	0.7	12.2

Distribution

The distribution system covers the distribution of electricity to consumers, as well as the customer support system. It includes the high-voltage and low-voltage lines and transformer stations. The customer support section includes the company's territorial regions and the marketing division. The IEC's consumers are divided into a number of sectors (Table 2).

The average price for electricity at present is approximately 7 US cents/kWh. In the last nine years, the prices have declined by 27% in real value.

The East Jerusalem Electric Corporation

Prior to 1967, the East Jerusalem Electric Corporation supplied electricity to the region west of the Jordan river, on behalf of the Kingdom of Jordan. At present, the Ministry of National Infrastructure grants the company a licence for the transmission and distribution of electricity. The company buys electricity in bulk from the IEC and supplies it to consumers in East Jerusalem and other specific areas.

Private electricity producers

The private generation of electricity by independent producers has operated on a relatively small scale for the past 12 years (one per cent of the total installed generation capacity of the IEC in 1998). The private sector has recently started to grow as a result of a government resolution passed in 1995 and the Electricity Industry Law of 1996, which contains provisions for the generation of electricity by private producers. It allows private production of electricity up to a total of 20% of the IEC's installed generation capacity.

Public Utilities Authority-Electricity

The PUA was established under the Electricity Industry Law of March 1996. The law provides for the establishment of the PUA and defines its structure, status, functions, and power in the electricity industry.

Background

The establishment of a PUA to regulate the electricity industry in Israel traces its origin to the recommendations by several committees that were active during 1992–94. These committees were set up by the government to examine the electricity rates and the desirable structure of the electricity industry upon expiration of the concession granted to the IEC. The following conclusion was presented.

> *There is no doubt that the government's conflict of interests as the proprietor of the Israel Electric Corporation on the one hand, and as the regulator of electricity rates on the other hand, generates obstacles and complications in these areas, and the Committee is therefore of the opinion that it is necessary to separate the regulation of electricity rates and of consumer protection from the governmental regulatory system, and to entrust it to an independent public utilities authority which will specialize in these areas and will be granted the power to determine electricity rates while balancing the interests of all the parties concerned.*

Functions and power

The mission of the PUA is to regulate the vital services of electricity in the country. The regulation must be carried out at a high professional level, while maintaining a balance of interests between the consumers, the IEC, private electricity producers, and the state. The functions of the PUA are defined by law, and in practice include three major domains of activities: setting rates, determination criteria for service quality and its measurement, and arbitration of consumers' complaints.

Rate setting

The law mandates the PUA to set electricity rates and determine the method for their update. The law also sets the underlying principles that determine and update the rates. It states that the PUA will approve a suitable return on capital and determine the rates on the basis of a 'cost principle', taking the quality of services into consideration. Cost principle means that each price item should reflect the cost of the relevant specific service, thus eliminating cross-subsidies. The PUA has also been granted the power to specify the manner in which the IEC should prepare its financial reports. It was given the right to disregard expenses incurred by the IEC, that are not required to fulfil the obligations of a vital service provider, as defined by the PUA.

Quality of service and electricity

Another essential function of the PUA is that of determining the criteria for the quality of service and electricity and its possible linkage to the rate-setting process. Feedback from the public and consumer organizations are taken into consideration while determining these criteria.

Arbitration
The law mandates the PUA to act as a forum for the presentation of positions and proposals from various consumer groups and organizations related to the electricity service in the country. Consumer complaints are commonly referred to the IEC. The PUA involves itself with consumer complaints either as an arbitrator or with matters of interest to the general public.

The law authorizes the PUA to set standards regarding accounting records and public reports. It is authorized to compel the utility companies to submit all information it may deem necessary to fulfil its duties.

A fundamental obligation of the PUA is to publicize 'the Authority's resolutions pursuant to this law'. Explanations of the method of determining the rates and statistical data should be included. Special circumstances may alter these procedures.

Structure

The PUA, though operating as a government agency, is totally independent and not subordinate to any government ministry. The PUA members constitute a panel of five commissioners who are entrusted with setting policies and passing resolutions necessary to carry out the PUA's functions in accordance with the law.

The PUA employees form the hired body of workers that carries out routine professional functions. There are two professional divisions, one dealing with the base rate resulting from the recognized expenses of the company and the other with the tariffs.

The PUA's current organizational structure is efficient. Key employees are aided by senior professionals, taken on as external consultants. Advanced work techniques are employed and principles of openness and clarity to the public are upheld.

Professional divisions

Economics and Accounts Division
The Economics and Accounts Division is responsible for the financial and accounting operations of the PUA. The head of the division leads a staff of economists who are assisted by consultants, economists, and accountants from the academic field and the private sector. The division develops the economic principles and regulation methodology. Financial and

economic position papers are prepared to support the decision-making process of the commissioners of the PUA.

The division's objectives are

- determining economic principles for regulation
- defining the accounting rules for the regulated companies
- determining the base rate
- setting a fair return on equity
- determining relevant efficiency coefficients
- calculating marginal costs
- determining the method for updating the base rate
- examining the forecast for the demand for electricity.

The division's activities are guided by a number of fundamental economic and accounting principles. The base rate is determined on the basis of incentive regulation and its components are determined normatively, wherever possible. The principles are simple and transparent.

Engineering and Customer Service Division

The organizational structure of the Engineering and Customer Service Division is based on three departments, which deal with (1) sector-based electricity rates; (2) public complaints (where the criteria for the quality of the service are analysed and defined); and (3) quality of the supplied electricity.

Electricity rates are divided into fixed payments and payments for consumption of electricity. Cross-subsidies among customers are minimized. The cost of connecting consumers to the electricity grid, of customer service, etc., are also covered by fixed payments. The structure of electricity rates is characterized by two main factors (1) the type of connection along the transmission grid and (2) the time of use. The type of connection depends on the level of voltage acquired by the consumer. Tariffs are calculated on the basis of cost along the electricity supply chain, with different rates for high-, medium-, and low-voltage connections. There is a difference in costs between periods of low and peak consumption. A time-of-use tariff, known as TOU, is calculated.

In recent years, there has been noticeable effort on the part of the IEC to improve service to its consumers, and enhance the company's image in the public eye. These efforts are manifested in several areas, including

- improvement of the company's system of internal administrative procedures
- efforts to achieve uniform treatment of customers in all districts
- the signing of a charter between the IEC and its customers

- development and operation of a multi-purpose centre for customer service by telephone.

Defining the nature of the service required is a difficult and subjective task. Information on the quality of service is gathered from three sources (1) inquiries by the public to the IEC and the PUA, (2) feedback from large consumer organizations, and (3) the cumulative experience in this field around the world.

The department handles complaints by the public which have not received a satisfactory response from the IEC. In addition, the department examines the way the IEC handles all complaints. At the end of each year, the PUA publishes a report on this activity.

The standards determined by the PUA relate to the mutual obligations of the utility company and the consumer. These standards include sanctions to be imposed on each side when these obligations are not fulfilled.

Large investments by the IEC, in accordance with the government's policy of developing the national infrastructure, form a significant component of the tariff. The development programme attempts to strike a balance between the increase in demand for electricity and the need for improvements in its quality.

The quality of electricity and power outages are measured on a national level by the SAIDI (system average interruption duration index), which expresses the total cumulative number of outages per year for the average consumer. This index improved from approximately 900 minutes in 1991 to 400 minutes in 1997. In most European countries and the US, the coefficient of minutes of non-supply to the consumer is much lower.

Present and future tariff settings

Present base rate and electricity tariffs

The base rate at present is about 7 US cents/kWh. It was determined from the summer of 1997 to 1 January 2000, on the basis of the following.

- Fuel, based on normative projected expenses for the period for which the tariff is valid.
- Operation and maintenance, based on approved expenses from the financial reports of the IEC.
- Capital services. Depreciation was calculated according to the approved expenses from the financial reports. The yearly return on active assets is 5.17%, linked to the official CPI. It was calculated according to a normative ratio of 1/3 equity capital (6.5%) and 2/3 borrowed capital (4.5%). The annual return of operating working capital was set at 4.5%. The present recognized base rate is shown in Table 3.

According to local rules, Israeli banks have a limitation on the amounts they may grant to a single borrower. Most of the

Table 3 Base rate, November 1998

Type of expenses	Rate (US cents)	Total (%)
Fuel	2.0	28
Operation	2.2	31
Return on assets and depreciation	2.8	41
Total base rate	7.0	100

recent outstanding loans, needed for the rapid expansion of the IEC, were therefore taken from overseas, in foreign currency. The financial statements of the company are presented in the Israeli currency, the shekel. In case of a change in the exchange rate, adjustments have to be made in the financial statements of the IEC. According to accepted accounting principles, this adjustment will show up as a change in financial expenses. In case of devaluation in the Israeli currency, the difference in the local value of the loans in foreign currency will show up as a financial expense in the statements. Since the IEC is unable to protect its exposure to devaluation, the PUA decided to hedge a part of it. The hedged amount has been calculated as follows.

- About 60% of the total long-term loans are in foreign currency.
- The normative ratio between equity and long-term debts is 1:3.
- The value of the fixed assets, recognized by the PUA on 1 January 1998, is 22.5 billion Israeli shekels (equivalent at that time to approximately 6.3 billion dollars).
- It was decided to hedge 9 billion shekels (60% × 2/3 × 22.5).

These 9 billion shekels are linked to the real change in the exchange rate of a normative basket of foreign currencies. This regulation insured the company against huge financial losses, due to a sudden devaluation of the shekel. To avoid huge fluctuations in tariffs caused by changes in the exchange rate, the compensation due to the utility was spread over several years. In case of evaluation, the system will, in a similar manner, transfer the financial income from the IEC to the public.

Ongoing updating of the tariff during the period in which it is in force is carried out according to the following mechanism.

- The price index of liquid fuels is based on the price of fuel in the Mediterranean basin.

- The price of coal is updated according to the decisions of the Coal Board, on the basis of rules determined by the PUA.
- The other components are, for the most part, linked to the CPI.
- The tariff is automatically updated every six months, or whenever there is a change of at least 3.5% in the cost of the input basket by comparison to its last update, whichever comes first.
- The efficiency coefficient is applied to the entire tariff. It includes a fixed element of two per cent per annum, and a variable element, equal to one-third of the increase in annual consumption of electricity, exceeding five per cent.

Cost of production varies with time, depending on the demand. The TOU tariffs are based on the cost of the last production unit needed at a given time (marginal production costing). For practical reasons, however, these tariffs have been gathered in clusters, according to the following principle: the clusters are characterized by minimum differences of demand within a cluster, and maximum differences between them.

Statistical analysis has divided the year into nine clusters. Three seasons of demand have been defined throughout the year. Hours of demand have been gathered in three clusters throughout the day: in peak-load hours, shoulder-load hours, and base-load hours. The major peak in Israel is generally in the winter. In the past few years, summer peaks have grown, almost to the winter peak level. The summer peak-hour cluster is more extended, over hours of the day on workdays of the week. The winter peak-hour cluster extends over evening hours, as well as during daytime on week days. The base-load cluster is defined at night hours, and all day on Shabbat, the weekend day. The remainder of the year is defined as the transitional season. Fridays and eves of feasts are also a part of this cluster. Shoulder-load hours are generally day-hours, not defined as peak-hours, or as base-load hours. The present tariff structure is shown in Table 4.

Base rate and electricity tariffs for the year 2000

The PUA is setting a new tariff structure for the period starting from 1 January 2000. The new tariff structure will be valid for five years. It will be different from the present one as outlined below.

- The base rate will be based on separate evaluations of the cost of production, high-voltage transmission, medium-voltage distribution, low-voltage distribution, and sales.

Table 4 Electricity tariffs, November 1998

Type of tariff	Subdivision	Low voltage	Medium voltage	High voltage
Time of use (per kWh in US cents)	Summer/Peak	13.5	11.2	10.5
	Summer/Shoulder	8.8	7.4	6.6
	Summer/Base load	4.1	3.4	3.1
	Winter/Peak	18.8	15.7	14.1
	Winter/Shoulder	8.2	6.8	6.1
	Winter/Base load	4.2	3.5	3.2
	Transitional /Peak	11.0	9.1	8.2
	Transitional /Shoulder	8.3	6.9	6.2
	Transitional /Base Load	3.9	3.2	2.9
Fixed payment (US $)	Monthly	20.0	20.0	20.0
Household, agriculture (per kWh in US cents)		7.4		
Fixed payment (US $)	Monthly	1.9		
Street illumination (per kWh in US cents)		6.0		
Fixed payment (US $)	Monthly	10.1		
General (per kWh in US cents)		8.2		
Fixed payment (US $)	Monthly	3.4		
Bulk sales (per kWh in US cents)		7.2	6.0	

These evaluations will be based on unbundled performance statements of the IEC.

- The Israel Electricity Law of 1996 sets the legal framework for utilizing the national grid for the sale of privately produced electricity. The separate tariff, which will be determined for transmission, will enable the IPPs to use the grid for selling directly to end-users.
- A benchmarking programme will compare the performance of the IEC with comparable units of companies elsewhere. The result will be the basis for the determination of separate yearly efficiency coefficients for each component of IEC's activities.
- A special evaluation is made by external financial consultants to determine a reasonable rate of return on equity.

This rate will be applied for as long as the company is wholly owned by the government.

- A recalculation of the TOU tariffs is being carried out on the basis of the present consumption pattern and marginal system costs.
- The PUA is involved in creating the ingredients for performance-based regulation, which the PUA is planning to introduce in the future.

The department dealing with 'quality of supply' has begun researching the data characterizing the reliability of supply today. Coping with this issue requires the PUA to deal with the following four main aspects.

1 Quality of electricity and its measurement. Besides SAIDI, other indices will be added, such as the number and types of outages.
2 Reliability requirements of sectors of consumers.
3 Definition of the criteria to distinguish between consumers in terms of their requirement for reliability.
4 A quality-dependent tariff, with emphasis on power outages. The correlation between consumption and quality of electricity will affect the IEC's development plans for the coming years and with it the tariffs for electricity in general.

Central Electricity Regulatory Commission, New Delhi

Sanjeev S Ahluwalia

Tariff reform in India: a review of directions and issues

Transition to a liberalized environment: experiences and issues in regulation 198–214

Introduction

Tariff policy is the central preoccupation of electric power reforms in India. This is evident not only from the emphasis placed on tariff reforms in the reform acts but also from the content of legislative and regulatory initiatives. Chapter VI of the ERC (Electricity Regulatory Commissions) Act, 1998 is devoted to energy tariff. A similar urgency is not visible to tackle headlong via legalisation other issues like improvement in the quality of supply, handling of consumer grievances, or introduction of choice for the consumer. These areas of present consumer dissatisfaction are expected to improve as a consequence of the general increase in efficiency of operations as required under the Act. This preoccupation with tariff policy reform, as the hallmark for successful sector reform, though understandable in the Indian context where financial bankruptcy of public electric power utilities and the consequential inability to bridge the demand–supply gap have been the primary drivers of reforms, needs to be accepted with caution.

In a highly distorted retail tariff environment, as is prevalent in India, there is threat of driving expectation of tariff rationalization to unachievable levels while simultaneously perpetrating a feeling of helplessness, if not despair, in the event of achievements falling short of intentions. A related problem with the reform tariffs or perish approach is the overwhelming importance given to the reduction of cross-subsidies in retail tariffs. It is nobody's case to deny that we would all be better off if these cross-subsidies do not exist. However, to expect the political economy of compulsions which drove decision makers to opt in favour of such subsidies to suddenly disappear seems naive. It is equally naive to put one's faith in 'independent regulation' as the immediate conduit to rational tariffs and financially viable utilities. Independent regulators, even those with a minimal commitment to equity, will find it very difficult to rule in favour of financial viability of the utility without reference to the 'allowability' of costs which are sought to be passed onto consumers. High levels of managerial inefficiency, inadequate institutional capacity, and the poor performance levels of public utilities, in general, make improvements in these areas much larger and immediately available pools of potential income as compared to the income potential from rationalization of subsidies. In the face of such obvious inefficiencies, it is the rare regulator whose concern for the financial viability of the utility will override the need to further consumer interests.

Legislative basis of tariff reform

Driven by financial emergency, falling investment, and the consequential increase in the energy demand–supply gap, the reform process has focused on tariff reform. Significant changes have been made, in the principles and the institutional structure for tariff regulation and determination, aimed at increasing efficiency, facilitating the entry of the private sector, increasing competition, and institutionalizing independent regulation.

The Electricity Laws (Amendment) Act, 1991 provided the legislative basis for facilitation of private investment and management in this sector, which hitherto had primarily been managed by the public sector. Consequently, along with enabling changes in licensing provisions for private sector entry, an increase was also effected in the maximum allowable rate of return as prescribed in the Sixth Schedule of the Electricity (Supply) Act, 1948.

Subsequently, the ERC Act, 1998 addressed tariff policy more substantively. Chapter VI of this Act prescribes that tariff must be

- regulated and determined by the Central Electricity Regulatory Commission for all generation entities owned by the central government, other generators supplying to more than one state, and in the case of interstate transmission
- regulated by the Central Electricity Regulatory Commission and determined by the state electricity regulatory commissions in the case of all other generation and transmission
- earn an adequate return for, and encourage the commercial functioning of, generating, transmission, and distribution entities
- structured to progressively reflect the costs of supply of electricity at an adequately and improving level of efficiency
- protect the interests of the consumer particularly where service providers have dominant positions
- based on the average costs of supply in the case of retail tariffs
- reflective of and encourage efficiency, economy, good performance, and optimum investments

- guided by the financial principles of the Sixth Schedule of the Electricity (Supply) Act, 1948.

Far reaching as the ERC Act is, it is not a complete departure from tradition. Electricity regulation in India dates to the turn of this century. The earliest legislation concerning electricity tariffs in India was the Indian Electricity Act, 1903. This was amended in 1910 and one of the several stated objects and reasons of that amendment was the following.

> *The practical effect of the present system has been delay...in obtaining licences...delays of this nature are most detrimental to the attraction of capital for the development of the resources of the country...*

Many private investors, even today, would sympathize with the predicament of the licensees at the beginning of the 20th century and laud the stated intentions behind the 1910 amendment. It seems that legislative requirements to attract private capital to the power sector were fairly similar to those required today.

The Electricity (Supply) Act, 1948 specified tariff principles and procedure in more detail. Many of the principles enumerated in the ERC Act, 1998 date to the Electricity (Supply) Act, 1948. These principles have been amplified from time-to-time through government notifications based on the investigations of expert committees.

Administrative basis of tariff reform

The K P Rao Committee Report, June 1990 is the basis on which the cost norms for central generating stations are decided and applied for tariff determination. This report also formed the foundation for a restructuring of tariff on the basis of performance orientation, time-of-use tariff, availability-based fixed charges, and pricing of reactive power. This was followed by the report prepared by the Energy Control Consultants on the optimum tariff structure for inter-utility power transfer and transmission tariff submitted in February 1994. To review these recommendations, the Government of India appointed a national task force which submitted its report in July 1996 recommending the adoption of a time-block differentiated, availability-based, two-part tariff, adjusted seasonally. This has subsequently been followed by the proposal to implement frequency-linked availability tariff to enforce grid discipline, improve grid conditions and security, and ensure merit order despatch. The Shankarguruswamy Report, July 1997 has similarly laid the basis for a restructuring of transmission tariff and facilitation of the private sector into transmission.

The post-1990 phase has been particularly active in re-examining the efficiency and effectiveness of the existing tariff arrangements. This was particularly true for retail tariffs. The need for progressively increasing realization towards cost and the need for minimum levels of cost recovery was subject of agreement at the level of chief ministers of the states in 1996. The Orissa Electricity Reform Act, 1995 was the first attempt to codify these varied developments in the reform of generation, transmission, and distribution. This was subsequently followed by a similar legislation in Haryana. In addition to establishing the principles for rationalization of tariffs, reduction of cross-subsidies, increased use of the long-run marginal cost concept, these Acts emphasized the role of competition in increasing the efficiency of operations and investment, stressed the increased involvement of the private sector, and established the scope and content of independent regulation.

Significant advances had already been made through notification, state legislation, and professional and academic consensus regarding the directions for tariff reform. The achievement of the ERC Act, 1998 therefore lay not in the new directions it set or the principles it established. Its primary role was to represent the never before achieved national consensus on the principles which should govern power development in India and in particular the directions for the restructuring and regulation of tariffs.

Issues in tariff regulation

The immediate issue before the central and state regulators is how to make a difference. There are very high expectations from independent regulation. The mere externment of decision-making powers from governments is expected to, somehow, show better results than in the past. The common perception of a good result is a 'no regrets' option. The trade-off is complex.

- Regulators must balance the need to cushion the tariff shock of adjustment for consumers with the need to ensure financial viability of the utilities, particularly in the case of potential private investors.
- They must draw a fine line between 'adequate' and 'generous' returns to attract fresh capital into the sector.
- They must preserve the 'good' financial performance of the dominant central utilities and yet create a level playing field between private and public utilities.

- They must create competitive conditions in investment and energy supply without disrupting short-term investment and growth, much of which comes from the public utilities operating as protected monopolies.
- They must balance the need to unbundle aggregate costs for more efficient cost allocation with the incremental cost of such unbundling and allocation.
- They will have to reconcile the compulsions of the local and the global environment, dictating a shift to full environmental cost accounting, with the short- and medium-term impact on economic growth.
- They must establish clarity and continuity in regulatory practice without parting completely with regulatory discretion and innovation in adapting to a dynamic business environment.

It may be instructive at this stage to examine a few critical tariff-related issues of regulatory interest.

Adequacy of return

Under the provisions of Section 43 A(2) of the Electricity (Supply) Act, the Government of India is competent to prescribe the tariff for central generators and other generators supplying power to more than one state. Under the liberalized regime introduced in 1991 for IPPs (independent power producers), the post-tax return was fixed at 16% (in the currency in which debt and equity was brought in) for a normative generation of 6000 hours per kW per year (plant load factor) of 68.5%. Generation above the norm could earn an incentive capped at 0.7% points for every additional 1% of generation. This generous incentive on the rather low normative generation of 68.5% can earn a post-tax return (net of foreign exchange fluctuations, except on the incentive payment) of 24% at a generation level of 80%. Hence, adequacy of return for IPPs is virtually assured.

At that time five Indian private sector licensees were operating in generation and distribution, whose tariff was regulated under the Sixth Schedule of the Electricity (Supply) Act, 1948. The Sixth Schedule provides that the maximum return on the capital base (defined as the difference between gross fixed assets, work in progress, and working capital less cumulative depreciation, loans, and consumer contributions) could be standard rate plus one half a percentage point on the outstanding values of all loans. The standard rate which is the major component of the return is defined as a variable rate linked to the Reserve Bank rate (a benchmark rate at which the Indian Central Bank provides funds to banks) plus a margin. In 1991, vide an amendment the margin was raised to 5% points from 2% points over the RBI rate, in recognition of the needs of private investors who at that time felt comfortable with a minimum return of around 17% (apart from protection against exchange risk).

In case of central government generators, the post-tax return was recently revised by the Government of India to 16% from 12%, with retrospective effect from 1995, at normative generation levels ranging from 63% plant load factor in general to a lower level of 57% for the eastern region. Central government generators also earn an incentive of 1 paise (100 paise make a rupee) per kWh for every one per cent increase in plant load factor above the normative level of generation of 6000/5500 hours per year per kW of capacity – very nominal as compared to the incentive available to the IPPs. However, central government generators are compensated by the fact that the base for determining return is a notional 50% of the depreciated value of the capital assets, irrespective of the actual capital structure. The SEBs (state electricity boards) have stated that this provides a significant advantage to CGS, as compared to IPPs, since optimum capital structures tend to be more leveraged. The real return, before incentive, if a CGS has an actual debt equity ratio of 2:1 is 24% as against the nominal return of 16%. The SEBs claim that this significantly dilutes the disadvantage suffered by CGS of having higher availability targets compared to IPPs.

Irrespective of the slope of the playing field between IPPs and central government generators, the abundance of generation projects awaiting financial closure is evidence of the attractive returns to investment in generation. After liberalization in 1991 and by 1996, over 160 proposals for a generation capacity of more than 80 000 MW, equal to the installed national capacity at that time, had been received. Only a handful have managed financial closure. However, the reasons are to be found in non-tariff commercial barriers.

Transmission is as advantageously placed as generation. A post-tax rate of return of 16% is assured (apart from protection for exchange risk on debt and equity) at a normative availability of 95% as per the notification of the Government of India dated 17 December 1997. Achievement of a higher availability earns an incentive of one per cent for every one per cent increase in availability. The achieved availability is in the region of 98% and hence the average return earned in transmission is 19% after tax. The adequacy of return in transmission is illustrated by the severe competition, including that from premier foreign transmission entities as in the case of the evacuation project linked to the Cogentrix and Nagarjuna, both Mangalore-based 2500-MW generation projects. This bid was finally won by National Grid of UK which will form a joint venture with the Karnataka State Electricity Board.

The adequacy of return has, however, become an issue in the case of distribution. Under the provisions of the Sixth Schedule of the Electricity (Supply) Act, a licensee can earn a maximum reasonable return of 15.5% at an RBI (Reserve Bank of India) rate of 10.5% (5% over the RBI rate plus approximately 1% additional on account of outstanding loans). In addition, any surplus in excess of such return, limited to 20% of the reasonable return, can be retained in specified ways. A maximum surplus, over reasonable return, of five per cent can be directly retained by the licensee; one half of the residual surplus can be retained as a tariff and dividend reserve while the remaining one-half has to be passed on to the consumers. Thus, the maximum return is around 19% at an RBI rate of 10.5% with a maximum surplus of 20% over reasonable return. The Report of the Committee on Private Sector Participation in Power Distribution (March 1998, pp 72), also called the Coehlo Committee after its Chairman, opines that due to the complex nature of the distribution business, returns in distribution should be higher than in generation. The report concludes that the present tariff structure could provide comparable returns to distribution. However, the privatization experience, though admittedly shallow, has not upheld this view. In Orissa, no bids were received in January for one of the four distribution companies offered on a competitive basis to private investors, and only two valid bids were received for the other three companies. Inadequacy of return has been cited as one reason. Lack of regulatory clarity about the future environment has been cited as another.

The adequacy of return to capital invested in the Indian power sector is a prime area of concern for regulators in view of the urgent need to bridge the existing demand–supply gap and provide the infrastructure for future growth. The subject acquires an immediacy, particularly in the cost-plus regulatory regime currently followed in India. It is not useful to fix a static nominal value as being an 'adequate return'. In a liberalized environment, the adequacy of return to pull in investment capital is a function of competing investment opportunities elsewhere in India and abroad, and the risk perception of the sector. There is clearly little a regulator can do about the opportunity cost of capital. However, regulatory initiative in the minimization of risk has considerable

Table 1 Comparison of interest rates, rates of return, and other macroeconomic indicators for 1998

Nature of investment	Return
RBI rate in 1998	11%-10.5%
Reasonable return in electric power with incentive at 85% generation	19%-26%
Prime lending rate of State Bank of India in 1998	12.75%-14.5%
Inflation per annum in 1998	5.3%-8.9%
Depreciation in Indian rupees over 1998	7.9%

Source RBI (1998)

potential. This is dealt more substantively in the next section. Here, it may be instructive to compare the rates of return for different sub-sectors in electric power, as enumerated above, with some reference rates in the Indian economy. Table 1 compares the RBI rate, reasonable return in electric power, and the prime lending rate of the State Bank of India (the rate at which the premier commercial bank in India lends to prime corporates), and the inflation and depreciation over 1998.

It is noteworthy that reasonable return from investments in power were at least six per cent more than the rate at which funds were available to prime corporates in India. Over this period, the real return in power, after discounting inflation, ranged between 14% and 17%, encouraged in part by the high real interest rates prevailing over this period. The rate of return, even in distribution, which was at the low end for the sector, was fairly comfortable, though analysis over a longer time span would be needed to reach any conclusions regarding the medium-term trend in rate of return. Clearly, despite an adequate tariff structure for return on investments, non-tariff barriers have hampered the inflow of investment.

Risk optimization

The severe financial emergency which the electric power sector is passing through is at the root of the heightened perceptions of risk in this sector. The financial crunch is most extreme in the distribution segment, particularly in rural distribution. This is evidenced by the robust balance sheets of generators and transmitters in comparison with distributors. The five private licensees also have sound fundamentals.

However, unlike the much larger public distribution utilities, these are predominantly urban operations. The distribution sector exerts a domino effect. Cash losses in distribution have resulted in the progressive piling up of huge liabilities payable to the central generators, fuel/suppliers, and transporters. The outstanding payments of state utilities to central utilities alone increased from 110 billion rupees in January 1998 to 148 billion in rupees September 1998 or close to 30% of annual billings of these utilities. Inadequate cash flows have increased the risk perception of selling power to public distribution utilities. Generators and fuel suppliers have been demanding sovereign guarantees and escrow arrangements for reducing their risk exposure, which have not been forthcoming due to the 'sink or swim' policy decision of the Government of India to limit its exposure to a problem which is to be tackled by the states. The fact that the bulk of the escrowable revenue of the state utilities has already been allocated to existing lenders, mostly central government-sponsored and government-owned banks and developmental financial institutions, has not helped. The result has been a slowdown in the implementation of private generation projects and a cautious approach to entering distribution, particularly by foreign investors.

Improving the financial status of utilities is clearly a prime regulatory requirement. However, this is likely to be possible only over the medium term, with improvements in efficiency of operations and rationalization of tariff as preconditions. In the short term, regulatory initiatives to allocate risks better and mitigate risks will be required.

The primary initiative should clearly be to formulate regulatory principles and procedures in a transparent, consensual manner with due regard to the weight of technical and scientific knowledge and 'best practice' methods followed elsewhere. The second step should be to ensure regulatory clarity, uniformity, and continuity. This is particularly important in India due to the dual tier of central- and state-level regulators and the large number (26) of state regulators.

In the interim, till financial security becomes possible, regulators will need to intervene actively to ensure the principle of equity and efficiency in the allocation and utilization of cash resources of regulated entities. There is a possible risk of regulatory overdrive and the usurpation of managerial autonomy. However, regulatory intervention is ensuring that payments are made when due, is inevitable if the rate of return expectations, and hence the tariff, are to be kept at reasonable levels. The Government of India has already proposed the creation of a power trading corporation which would mitigate the payment risk for the mega projects by acting as an intermediary between the mega project and the state-level distribution utilities and by exercising greater flexibility in matching unmet demand with supply.

There is little a regulator can do to reduce the macroeconomic risk associated with currency depreciation. However, it seems reasonable to try and level the playing field between foreign and domestic investors, especially in the light of the unstable global situation. Unfortunately, the foreign exchange hedging market in India is not well developed and long-term cover is not available at reasonable cost. Hence, there appears to be no alternative to exchange-risk protection if foreign equity capital is to be induced into this sector. Electric power is a prime input into the export effort. While it may be administratively complex to link export benefits to the power supplied to export-oriented units in a very exact manner, the elasticity of exports to the supply of good quality power at an internationally competitive tariff should be considered while debating the desirability of exchange-risk protection for foreign investments in power.

Valuation of assets

Valuating assets on the basis of their current market value is a matter of management discretion. Sections 6 and 7A of the Indian Electricity Act, 1910 provide that when a licence is revoked or expires, the assets must be purchased from the licensee at the market value. There was a clear recognition, at the beginning of the century, of the principles of opportunity cost. A licensee who was forced to surrender his licence to the state or a local authority was entitled to the market value of the assets, except to the extent financed by consumer contributions. By implication, the allowable cost of acquisition of assets and hence the capital base for determining the rate of return was the market value of the assets. However, the Act, through an amendment to the Sixth Schedule effected in 1959 permits only the use of 'original cost' in determining the capital base. Original cost is defined as the cost of delivery and erection, properly incurred, to bring the fixed asset to beneficial use. This concept has been criticized as being contrary to the concept of opportunity cost of capital since it could result in under-valuation of assets. The concept of original cost appears to have gained favour at that time to acquire the assets of all licensees on expiry of the licence. This phase gathered momentum in 1976 when a number of private industries were nationalized. The use of original cost effectively reduced the burden of acquisition. It is amusing, therefore, to note that a reversal to the concept of revalued assets in defining the capital base took place in the case of Orissa recently. The assets of the erstwhile Orissa State Electricity Board were transferred to the new corporate utility, Gridco, created under the reform programme in 1996 on a revalued basis sharply increasing the original value of 12 billion rupees to a new value of 23.2 billion rupees, as determined by the Government of Orissa. Despite the opposition of consumer groups to this inflation in the asset base, and hence the capital base, the OERC (Orissa Electricity Regulatory Commission) has chosen not to interfere in the transfer value through two tariff proceedings in 1997 and 1998.

A revalued asset base provides the investor with higher volumes of cash via higher depreciation and higher levels of reasonable return. The net asset value is relatively easier to compute and understand than alternative methods of valuing a business, hence its popularity in privatization programmes. Negative asset values are difficult to justify and are perceived to reduce the bargaining power of the seller. Revaluation boosts the net worth and is seen to provide the correct price signals for a satisfactory sale. It is unclear as to how important such values are for the buyer who probably relies more on a valuation of future returns. However, there is a clear downside in that revaluation inflates tariff thus making the process of tariff rationalization more burdensome. It makes future consumers pay for past losses. Where customers are paying for subsidies enjoyed by them in the past the result is not iniquitous. Clearly the use of this mechanism will have to be judicious. Revaluation of assets by a utility which has failed to perform on any efficiency parameter will be viewed as a financial gimmick to shore up the balance sheet and is bound to meet regulatory and public opposition. Capital restructuring, accompanied by real gains in productivity and efficiency, on the other hand, can be viewed as a justifiable financial innovation of a proactive utility. This link between the transition to a market-oriented liberalized framework for defining the capital base and the need for the utility to be seen as competitive and efficient provides one of the many opportunities for the regulatory transformation from a cost-plus to a performance-based approach to rate-making.

Unbundling and cost allocation

The existing procedures for tariff determination use the concept of regional averaging of normative cost fairly extensively. Hence in generation, merit order despatch is not done on actual cost because systems do not exist to make the actual costs available on real time basis to load despatchers. Instead normative cost parameters are developed on a regional basis, necessarily averaging performance, within a technology or fuel type and are used as a proxy for actual costs. Distributors and other customers are not charged on the basis of the costs incurred on specific transmission lines used to meet their bulk demand. Instead the average transmission costs of the lines, within each of the five regions in India, are used to determine the transmission tariff in the region. Retail customers are not charged on the actual cost of supply to meet their demand. Instead tariffs are determined in relation to the average cost of supply across all customers. Indeed the ERC Act, 1998 states that retail tariffs should be based on the average cost of supply. The fact that non-preferential treatment of customers does not necessarily mean common tariffs was recognized even in the Indian Electricity Act, 1910. Tariffs could vary across customers on the basis of objective factors such as load and time of supply, indicating recognition, even at the beginning of the century, of the need to relate tariff to cost of supply. This is a principle which was ignored in the intervening period and is now being reasserted. In generation, there is recognition that merit order of despatch must be defined on the basis of actual variable cost. Private sector participation in developing and managing transmission lines can be best facilitated and competition encouraged by varying transmission charges for specific lines. Time discrimination in tariff determination has already been urged by the OERC and rudimentary time-of-day pricing encouraged. Fundamental to the unbundling of costs is the ability of the utility to meter supply at interchange and supply points. While conditions vary, metered customers form a small minority in most utilities. The Indian Electricity Act, 1910 makes metering mandatory. A rapid extension in the metering capacity for Indian utility is a precondition to achieve the regulatory objective of unbundling and better allocation of costs through tariffs.

Marginal versus historical costs

The use of marginal cost does not specifically find mention in the ERC Act, 1998. However, its use has been established by regulatory precedent. The OERC requires licensees to submit their rate cases on the basis of both historical and marginal costs. The enhanced use and awareness of marginal costs is dictated not by the economic argument alone that these provide the correct price signals for future investment; though this by itself is a powerful reason for their adoption in developing economies. Equally important is the fact that the calculation of marginal cost requires a precise and exact knowledge of future power demand an supply trends, investment costs, technology trends, and operational and environmental standards. This requires the application of sophisticated planning tools and procedures which, if adopted, would provide the externality of more efficient operations being done at present as well.

Incentives/disincentives for performance improvements

Performance-linked incentives are not foreign to the existing regulatory regime. The Sixth Schedule provides for the retention by the utility of around 66% of any surplus (with a cap of 20% reasonable return) generated by it over and above the reasonable return. Incentive tariffs in generation and transmission have been in existence for some time now. The November 1998 tariff order of the OERC linked the rate of return to the reduction of T&D (transmission and distribution) loss. It innovatively permitted the utility a deferred recoupment of the efficiency gain, along with interest at the RBI rate, for all reductions in T&D loss below the cut-off level of 41%, to be available once the utility reaches a normative T&D loss target of 35%. In addition, reductions below the level of 35% will earn the utility an incentive at the rate of 1% point additional return for every 1% point reduction in T&D loss. While an intensive review of the incentive structure in general is undoubtedly due, what is more crucial is a competition policy.

Competition policy

Currently competition in generation is essentially restricted to the entry level at the time of bidding for capacity addition. Theoretically, 'take or pay' arrangements and shortage should create conditions detrimental to the furtherance of competition and efficiency. However, the poor creditworthiness of most public distribution utilities is exerting unique pressures on generators to become more competitive and efficient. Generators are aware that despatchability at competitive rates is one way to retain the appetite for their energy supply and hence for the release of regular payments. Low-cost plants will always be preferred in times of financial stringency or excess supply. While excess supply is a phenomenon visible only in the eastern region today, it can be foreseen in the western region as well. The efficiency enhancing effects of competition can be realized through the establishment of regional trading pools, though a national pool is constrained by the inadequate inter-regional transmission capacity. This highlights the need to facilitate entry of multiple players into the business of ownership and management of transmission assets possibly driven by the arbitrage opportunities in power sale across regions. In distribution, technological barriers and historical under investment will retard rapid evolution to retail supply competition. The structure of cross-subsidization in retail tariff similarly retards the development of open access to large customers with the adverse impact on finances of the distribution utility, in the short/medium term till tariffs are rationalized. A similar competition-curbing trend is in evident in the Orissa restructuring model. Distributors are not permitted open access and all bulk sales are the monopoly of the newly-created public sector transmission entities, like the state transmission utility and Power Grid Corporation of India Limited (the central transmission utility), have additional and conflicting responsibility for system management and control under the provisions of the Electricity Laws (Amendment) Act, 1998. Clearly, functional unbundling of these distinct areas would not only enhance competitive forces but also enable better allocation of costs in rate design.

Transition strategy for tariff rationalization

The speed of tariff rationalization is constrained only by the likely burden on the hitherto subsidized consumers and impact on income generation and growth in agriculture, small industry, and small commercial enterprises. In general, all consumers at low tension are heavily subsidized. Average realizations of supply costs vary directly with the voltage of supply. On an average, low tension consumers rarely pay more than 40% of the historical cost of supply at that voltage while extra-high tension consumers may be charged 175% of the cost of supply at that voltage. In some states for select low tension consumers, power is either free or charged at flat or very nominal rates. These ratios of cost recovery will however vary depending on the system efficiency indicators, like T&D loss, used to calculate the cost of supply. Using historical voltage-of-supply level costs as a reference point, subsidized customers represent more than 99% of the customer base and around half of the energy consumption. These ratios vary widely across states and utilities. However, the large base of subsidized customers illustrate the magnitude of the adjustment problem and the political economy of compulsions driving the adjustment strategy.

The primary driver for retail tariff rationalization for the utility comes from the opportunity presented therein to correct the price signals sent to consumers and to increase revenues. The incessant increase in industrial tariff, at rates far in excess of inflation during the last 15 years has, in conjunction with a poor power supply situation, driven the industry away from the grid into self-generation. On an estimated installed self-generation capacity of 10 000 MW, at a peak time PLF of 33% (with energy not supplied valued at Rs 2.50/kWh), the revenue loss to Indian utilities would amount to 72 billion rupees while the loss of gross profits would be 15 billion rupees. This is roughly equal to the outstanding payments of these state-level utilities to the central generating stations. There are similar though lower levels of potential income to be earned from other consumers currently under supplied and by dispelling the supply constrained environment, which restricts the adoption of electric power intensive consumption patterns. These are the obvious and fairly considerable revenue gains for a utility from a reduction of the real price for electric power, for those who are being charged higher than the long-run marginal cost of supply. Similar gains will accrue through an increase in the realizations from hitherto subsidized customers. The incremental revenue will be a function of the price elasticity of demand of the subsidized consumers and the ability of the utility to police energy supply better. Higher tariffs also increase the incentive to steal power. A poorly-managed utility may end up pushing hitherto legal consumers on the margin, into becoming illegal 'tappers' in response to sharply higher tariffs. A sudden fall in demand, caused by better policing and price hike, can result in the burden of stranded capacity cost on the utility for a reduced volume of energy sale.

In contrast, the immediate revenue gains from reduction in line losses (at existing tariff levels) and more efficient operations can be estimated at a minimum level of 70 billion rupees from an avoided line loss of 10% at the prevailing low average rates of retail supply. Successful tariff rationalization strategies will be those which focus on the efficiency gains from improved operations and not from the soft option of raising tariff levels alone.

Prescriptive reorganization and restructuring

Improved efficiency in operations is not related to regulatory exhortation alone. The assumption that mere handing over of these utilities to the private sector will generate better management practices significant enough to solve the efficiency barriers facing public utilities today is also simplistic. Successful induction of the private sector requires a spirit of accommodation, political consensus, and stability, not evident in recent times. In India, the absence of an overt and immediate commitment to privatization has resulted in the adoption of a programme of privatization by attrition. The situation is allowed to deteriorate to a level where no stakeholder has any residual interest left in the preservation of the public utility before privatization is attempted. Whether in Orissa or Haryana there has never been a public recognition of the loss of faith is public sector functioning per se. The arguments for privatization are presented ingeniously and obscurely couched in financial and economic terms. They never focus on the inherent managerial inability of a public utility in India or on the less than progressive pattern of ownership control under which such public utilities function. These disabilities make public utilities uncompetitive and unviable. However, the lack of political consensus on privatization forces an extended time frame for reform. The downside of this approach is that if the privatization programme extends over long time frames and independent regulators are thereby forced to deal with public monopolies perpetually on the brink but never quite replaced by private operators, the efficiency gains from regulation will not be visible in the early years of reform.

The case of Orissa is a good example of the pitfalls of an extended programme of reform and adjustment. The regulator is constrained in the face of an underfunded, under-provided public utility, perpetually in default of even its own targets. The utility appears overwhelmed at the extent of the challenge thrown to it by the circumstances of reform. The Government of Orissa has adopted a hands-off attitude, having abdicated substantive powers in favour of the regulator. After more than two-and-a-half years of the reform programme, there is a likelihood that the net inflow to the state government from divestment of the distribution business where the bulk of the reform investment was done, is likely to be substantially less than the financial support expended in the reform programme.

Tariff policy reform, in the absence, or in advance of, structural reform, can become an ineffective instrument. To be effective, tariff policy must function in an environment conducive to the establishment of competitive benchmarks, where entry and exit are facilitated, factor substitution is possible, factor productivity rewarded, and technology infusion encouraged.

Conclusion

The regulatory challenge in India lies in being able to restructure the sector by minimizing public ownership and management, the speed of divestment being consistent with the short-term objectives of 'least disruptive but efficient' reform. The induction of the private sector must be accompanied by the introduction of competitive forces in generation and bulk supply and entry-level competition in transmission, distribution, and retail supply. Load despatch must be on merit order based on the actual unit costs. The transmission business must be administratively and financially insulated from the additional responsibilities of system control and planning given to it by the Electricity Laws (Amendment) Act, 1998 and transmission costs unbundled from the aggregate costs of the central transmission unit/state transmission unit operations. Tariff must be time-differentiated for all large consumers and based on the long-run marginal costs of supply as adjusted for prescriptive rates of return in the monopoly segments of transmission, distribution, and retail supply to small consumers. Functional unbundling of costs should be encouraged for better allocation to customer classes in rate-making. Bulk supply must be a competitive segment with open access to the grid for all suppliers, distributors, and large consumers. It should be set competitively, through private contracts, with caution that retail tariffs have a glass ceiling dictated by the national consensus on the need for a gradual adjustment process meeting the minimum incremental efficiency requirements. This extensive structural transformation is impossible without the active involvement of all stakeholders. However, most particularly, regulatory initiatives in strengthening consumer awareness and empowering consumer associations will provide the maximum dividends in harnessing the benefits of efficiency with equity.

Reference

RBI. 1998
Annual Report 1997/98
Mumbai: Reserve Bank of India

Power Grid Corporation of India Limited, New Delhi

Bhanu Bhushan

Availability tariff: an overview

Transition to a liberalized environment: experiences and issues in regulation 215–218

What is availability tariff

The term 'availability tariff' stands for a rational tariff structure for power supply from generating stations on a contracted basis. The power plants have 'fixed' and 'variable' costs. The fixed cost elements are interest on loan, return on equity, depreciation, O&M (operation and maintenance) expenses, insurance, taxes, and interest on working capital. The variable cost comprises the fuel cost – coal and oil in the case of thermal plants and nuclear fuel in the case of nuclear plants. In the availability tariff mechanism, the fixed and variable cost components are treated separately. The payment of fixed cost to the generating company is linked to availability of the plant, that is, its capability to deliver megawatts on a day-to-day basis. The total amount payable to the generating company over a year towards the fixed cost would depend on the average availability (megawatt delivering capability) of the plant over the year. If the average actually achieved over the year is higher than the specified norm for plant availability, the generating company would get a higher payment. If the average availability is lower, the payment would be lower. Hence the term 'availability tariff'. This is the first component of availability tariff, and is termed as capacity charge.

The second component of availability tariff is the energy charge comprising the variable cost of the power plant for generating energy as per the given schedule for the day. It may be noted that energy charge is not according to the actual generation and plant output, but is for the scheduled generation. If there are deviations from the schedule (for example, if a power plant delivers 600 MW while it was scheduled to supply only 500 MW), the energy charge payment would be for scheduled generation (500 MW) only, and the excess generation (100 MW) would be paid for at a certain rate which would depend on the system conditions prevailing at that time. If the grid has surplus power at that time and frequency is about 50 cycles, the rate would be less. If the excess generation occurs at a time of generation deficit in the system (in which condition the frequency would be below 50 cycles), the payment for extra generation would be at a high rate.

To recapitulate, availability tariff would comprise of three components (1) capacity charge, towards reimbursement of the fixed cost of the plant, linked to the plant's capability to supply megawatts; (2) energy charge, to reimburse the fuel cost for scheduled generation; and (3) a payment for deviations from schedule, at a rate dependent on system conditions. The last component would be negative in case the power plant is delivering less power than scheduled.

How the beneficiaries would share payments

The central generating stations in different regions of the country have various states of the region as their specified beneficiaries. The states have shares in these plants according to the Gadgil formula, and the shares are duly notified by the Central Electricity Authority or the Ministry of Power. In the proposed mechanism, the beneficiaries would have to pay the capacity charge for these plants in proportion to their share in the respective plants. This payment would be dependent only on the declared output capability of the plant for the day and the beneficiary's percentage share in the plant, and not on how much power/energy the beneficiary wants to draw (and/or actually draws) from the central station.

The energy charge to be paid by a beneficiary to a central station for a particular day shall be the fuel cost for the energy scheduled to be supplied from the power plant to this beneficiary on that day. In addition, if a beneficiary draws more power from the regional grid than the total scheduled to be supplied from the various central generating stations at that particular time, the beneficiary will have to pay for the excess drawal at a rate which would depend on the system conditions; the rate being low if the frequency is high and vice versa.

How the mechanism would work, and how generation would be scheduled

The process would start with the central generating stations in the region declaring their expected output capability for the next day to the RLDC (regional load despatch centre). The RLDC would break up and tabulate these output capability declarations as per the beneficiaries' plant-wise shares, and convey the same to the SLDCs (state load despatch centres). The latter would have to carry out an exercise to see how best they can meet the load of their consumers over the day, from their own generating stations and their entitlement in the central stations. They would also have to take care of the irrigation release requirements, load curtailment, etc., that they propose in their respective areas. The SLDCs would then have to convey to the RLDC how they wish to draw power from the central stations out of their entitlement for the day.

The RLDC would compile these and determine the generation schedules for the central generating stations and the drawal schedules for the beneficiaries. These schedules would then be issued by the RLDC to all concerned and would become the operational as well as the commercial data. However, there would be provision for revising the output capability declaration by central stations, the requisition by the beneficiaries, and accordingly the schedules, in case of contingencies.

While the schedules so finalized would become the operational data, and the regional constituents would be expected to regulate their generation and consumer load so that the actual generation and drawal are according to these schedules, deviations from these would be allowed as long as they do not endanger the system security. The schedules would also be used for determining the amounts payable as energy charges as described earlier. Deviations from the schedules would be determined in 15-minute time blocks through special metering, and their deviations would be priced as mentioned earlier. As long as the actual generation/drawal is according to the given schedule, the third component of availability tariff would be zero; if it is below the schedule, a beneficiary would be paid back according to the frequency dependent rate specified for the deviation from schedule.

Why is introduction of availability tariff necessary

At present, our regional grids are operating in a very unsatisfactory manner. There are large deviations in frequency from the rated frequency of 50 cycles. A low frequency situation occurs when the total generation available in the grid is less than the consumer load connected at that time. This can be checked by enhancing the generation and/or curtailing the consumer load. High frequency is a result of insufficient backing down of generation when the total consumer load comes down during off-peak hours. The present tariff mechanisms do not provide any incentive for either backing down the generation during off-peak hours or for reducing the consumer load / enhancing the generation during peak-load hours. In fact, there is a financial advantage today in generating at a high level even when the consumer demand has come down. In other words, the present tariff mechanism encourages grid indiscipline.

Availability tariff would directly address these issues. Firstly, by giving incentives for enhancing the output capability of the power plants, it would enable more consumer load to be met during peak load hours. Secondly, backing down during off-peak hours would not result in a financial loss to the generating station, therefore, neutralizing present incentive for not backing down and raising the system frequency. Thirdly, the shares of beneficiaries in the central generating stations would acquire an unprecedented meaning. The beneficiaries would have well-defined entitlements, and they would be able to draw power up to this at normal rates of the respective power plants. In case of over-drawal, they would have to pay at a high rate during peak load hours, which should discourage them from over-drawal and pulling down the frequency. This payment would go to the beneficiaries who received less energy than was scheduled.

How everybody would benefit

The mechanism would streamline the operation of the regional grids. There would be a defined scheduling procedure and the constituents would be encouraged to follow the given schedules for generation and drawal. Any constituent which helps the regional grid by drawing less than his share from the regional grid in a deficit situation would get compensated at a good price for the energy not drawn (in effect, power supplied back to the grid). Secondly, the grid parameters would improve and equipment damage would reduce correspondingly. The only way to improve the frequency during peak load hours is to reduce drawals and necessary incentives would be provided in the mechanism. A high frequency situation should also get checked by encouraging reduction in generation during off-peak hours. Thirdly, because of clear separation between fixed and variable charges, generation according to merit order would be encouraged and pit-head stations would normally not have to back down. The overall generation cost would accordingly come down. Fourthly, a mechanism would be established for harnessing captive and cogenerated power and for bilateral trading between the constituents.

International
Resources Group,
New Delhi

Mary Clark Webster

Power: tariff setting

Transition to a liberalized environment: experiences and
issues in regulation 219-223

Exhibit 1 *Characteristics of regulated rates*

1. Politically sensitive
2. May be driven by markets, incentives, or costs
3. May encourage or discourage energy consumption
4. May be socially engineered
5. Adjustment clauses may be used to collect some costs – purchased gas adjustments

Exhibit 2 *Utility rate-making objective*

Provide safe, reliable service at reasonable prices and have the opportunity (not a guarantee) to earn a reasonable return on invested capital

Exhibit 3 *Revenue requirement*

1. Demand forecast
2. Cost of service study

Exhibit 4 *Rate design*

1. Long-run marginal cost study
2. Cost allocation methodology
3. Bill impacts

Exhibit 5 *Cost of service rate-making model*

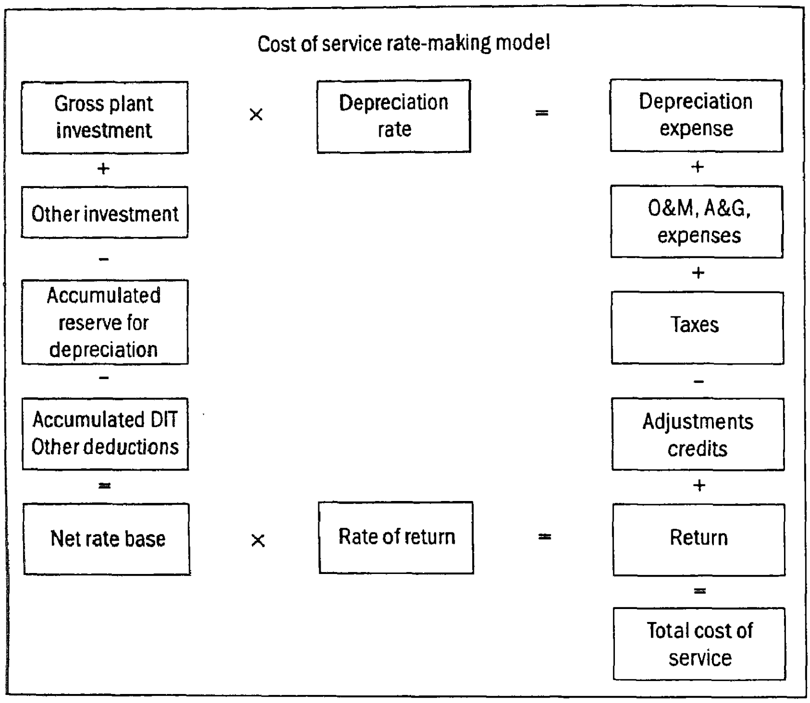


Exhibit 6 *Illustrative rate derivation*

	Allocated cost of service			Billing determinants		Rates (excluding gas costs)		
Service class	Demand ($)	Commodity ($)	*Total* ($)	Demand	Commodity	Monthly demand[1]	Commodity rate[2]	Average unit rate[3]
Residential	58200000	1800000	60000000	1100000	100000000	$4.4091	$0.0180	$0.1630
Commercial	29100000	900000	30000000	450000	100000000	$5.3889	$0.0090	$0.1862
Electric gen.	9700000	300000	10000000	375000	120000000	$2.1556	$0.0025	$0.0734
	97000000	3000000	100000000					

[1] Monthly demand rate = *annual* cost of service allocated to demand / demand billing determinants / 12 months

[2] Commodity rate = annual cost of service allocated to commodity / commodity billing determinants

[3] Average unit rate = ([monthly demand rate x 12] / 365) + commodity rate

Exhibit 7 *Typical utility rate case drivers*

1 To provide for changes (usually increases) in cost of service
  - Rate base (depreciation expense too)
  - Operation and maintenance (labour, materials, supplies, and cost of gas if no tracker)
  - Taxes – income and other
  - Rate of return (debt and equity)
  - Capital structure mix

2 Other changes
  - Changes in sales and transportation throughput volumes
  - Changes in rate design, and terms and conditions of service
  - PSC mandated changes (rate reductions, unbundling)
  - New services/meet competition/incentive plans
  - Cost trackers
  - Implement deregulation

Exhibit 8 *Parties to the regulatory process*

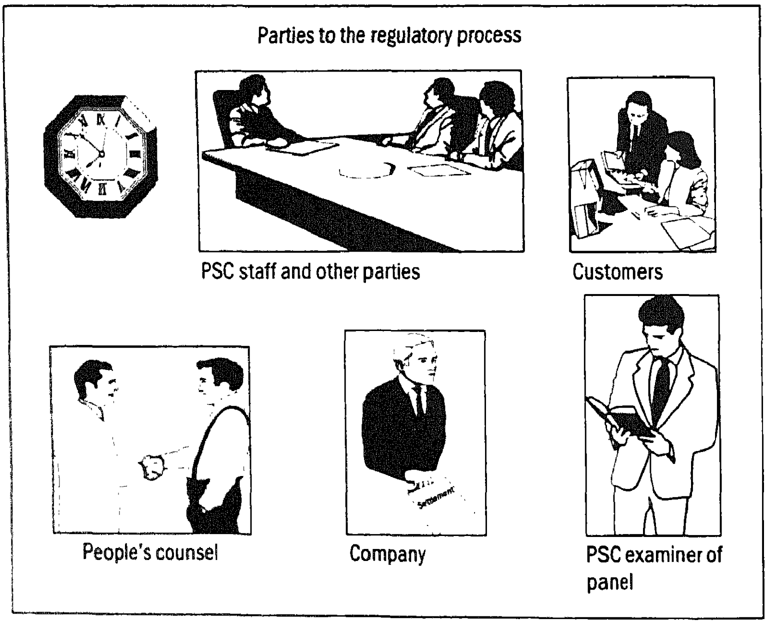

Parties to the regulatory process
PSC staff and other parties
Customers
People's counsel
Company
PSC examiner of panel

Exhibit 9 *Rate case cycle*

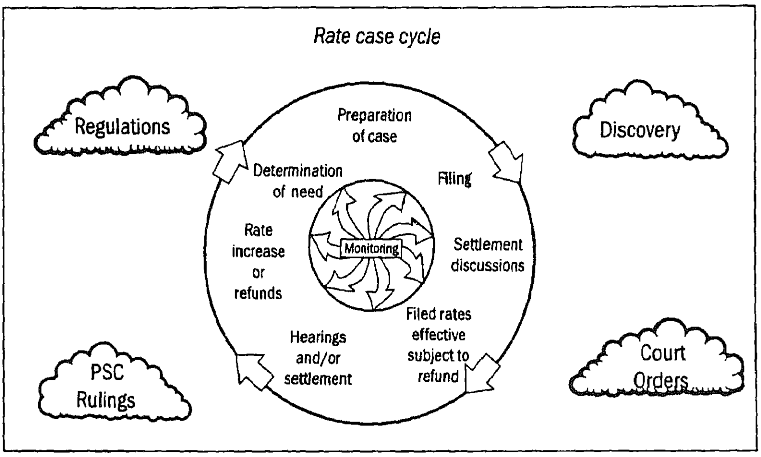
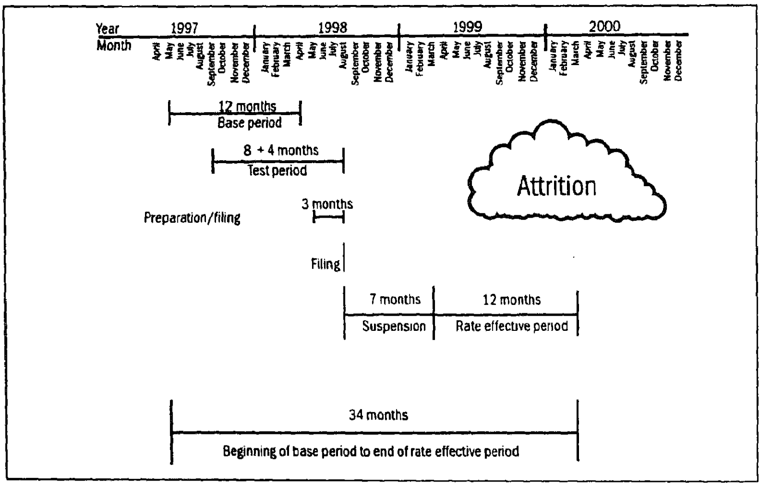


Exhibit 10 *Sample rate case time line*


Year
1997
1998
1999
2000
Month
April May June July August September October November December
January February March April May June July August September October November December
January February March April May June July August September October November December
January February March April May June July August September October November December
12 months
Base period
8 + 4 months
Test period
Preparation/filing
3 months
Filing
Attrition
7 months
Suspension
12 months
Rate effective period
34 months
Beginning of base period to end of rate effective period

Consumer Education and Research Centre, Ahmedabad

Manubhai Shah

Effectiveness of regulatory reforms: present and future strategies

Transition to a liberalized environment: experiences and issues in regulation 224-227

Introduction

The historical antecedents leading to the setting up of statutory regulatory authorities in a capitalist society such as the US and in India are very different. Public utilities, by their very nature and on the grounds of economics of massive capital investment, are accepted as inevitable economic monopolies. The underlying philosophy has been to let the regulatory authority do to an extent what competition would have done, subject to some inherent limitations. However, there has been no ambiguity about one major objective – the monopoly shall not be allowed to misuse or abuse its monopolistic power and control over the market.

Therefore, the concept of the Public Utilities Commission of the US developed on the lines of being a statutory, independent body acting as a quasi-judicial forum. This involved concepts of efficiency, economy, technological innovations, subsidies, cross-subsidies, differential tariffs, consumer empowerment and citizen group participation, free access to information, and award of funds and grants to citizen groups to enable them to make effective representation to promote and protect consumer interest.

The US and other western democracies have a longer and richer experience of the working of regulatory authorities. A sizeable amount of case law has also been built upon the aforesaid issues including the concept of unjust enrichment and different modus operandi to return or refund unjust enrichment to concerned individuals or classes of consumers along with appropriate accountability norms and framework. The US has one general legislative framework under which regulatory authorities have been constituted to deal with different services. But the statutory framework is one and uniform and so also the system and the procedure.

Regulation scenario in India

The presence of regulatory authorities in India is a recent phenomenon actuated by different considerations. In India, most utilities are in the public sector and are neither efficient nor economic in their operations. Being a losing proposition in most cases, the public services sector has not been able to attract investment necessary to build up the infrastructure for industrial and economic development of the country. A larger concern is whether these public utilities can provide adequate returns whereby they can attract fresh investment, if need be, even from foreign countries.

It is not being suggested that the two historical antecedents are incompatible and mutually exclusive. But these concerns will have a bearing on approaches, modus operandi, evolution of criteria, and to an extent, the possibility of undermining consumer interest. Unlike in the US, in India, different regulatory mechanisms have come under different statutes at different points of time and will continue to do so in the future. Consumers will have the additional problem of dealing with differing statutory frameworks, legal provisions, systems and procedures, etc.

Utilizing the independent statutory mechanism of a regulatory authority by consumer organizations to ensure that public utilities manage their affairs efficiently, economically, and on business principles is important. Unreasonable, unjustified, and non-standard costs should not be allowed to enter the tariff. Other considerations in terms of political interference, subsidies and leakage, losses, and theft should not adversely affect honest consumers.

The need to build capacity

As India does not have a history of regulatory authorities which promote and protect consumer interest, capacity building for consumer organizations becomes a major challenge. The little experience of the first visible statutory body, Securities and Exchange Board of India, shows that it has not been effective or successful in promoting and protecting the interest of investors, which is its major objective. This emphasizes that in India there is no good role model for the regulatory authority which can inspire confidence and provide insight into effective working.

Even though India has about 1300 consumer groups, they are not adequately equipped in terms of their financial, professional, and human resources. A few years ago, the Consumer Education and Research Centre, Ahmedabad carried out a study to assess the status of consumer organizations in India. Of the 700 consumer groups at that time, about 240 responded to the prescribed questionnaire. Analysis of the data shows that 48% of the consumer groups had an annual expenditure of Rs 10 000 while 10% had an annual expenditure of Rs 20 000.

There is a fairly wide gap between even the relatively resourceful groups. One consumer group with an annual expenditure of 10 million rupees supported by infrastructure of adequate land, building, library, laboratory, computer facility, and 80 employees is followed by a consumer group whose annual expenditure is 1 million rupees and has a modest office.

Even in the US, not all consumer groups have understood the technical, financial, and professional costing and accounting intricacies and hence have not been able to make effective representations before regulatory bodies. However, they have benefited due to their concept of locus standi being wider and having free access to information, transparent proceedings, effective public hearings, and involvement of well-meaning social activists even at an individual level.

Workshop to empower consumer groups

With a view to sensitize and empower consumer groups across the country to play this role, the ASCI (Administrative Staff College of India), Hyderabad and the Consumer Educational Research Centre jointly organized a programme in Hyderabad from 28 to 30 December 1998. The workshop was conducted by the faculty of the ASCI, the chairman and commissioners from the Central Electricity Regulatory Commission, the Orissa Electricity Regulatory Commission, Haryana Electricity Regulatory Commission, and office bearers from the Power Finance Corporation, and Andhra Pradesh State Electricity Board. The Consumer Education and Research Centre shared its earlier experience of dealing with state monopolistic public utilities like road, transport, electricity, telephone, airlines, and life insurance and contrasted this with the position in countries like the US. There also was an exchange of experiences on how the concept of inter-firm comparison has been used as a management tool and technique to identify the gaps in efficiency and economy of operations and even quantification thereof.

Consumer groups have a difficult role to play. On one hand, they have to use the services of the regulatory authorities to promote and protect consumer interest, and on the other, if regulatory authorities do not perform their statutory duties, consumer groups may have to challenge them and take them to higher courts.

As a follow up of the Hyderabad workshop, a broad plan has been worked out to enable consumer groups to share information and research findings among themselves. It has also been clarified that such capacity development and empowerment may not be possible for every consumer group. Each consumer group, therefore, should assess its strengths and weaknesses and decide the direction it wants to take.

way d

The next step may be similar regional workshops at four or five places in India where consumer groups from those regions can be assembled and oriented to the demands on time, skill, professional inputs, expertise, financial resources, etc., so that effective use is made of regulatory bodies.

At the same time, consumer groups need to view the regulatory authority not only in the context of one sector such as electricity, but in terms of effectively using services of other regulatory authorities for other services such as telecommunications, insurance, investor protection, and others which may develop in future. It is, therefore, imperative that consumer groups develop professional capabilities. If they cannot, regulatory authorities may be used more for the benefit of the providers of services than for consumers of services.

The Consumer Education and Research Centre has brought out the following publications which have been used as advocacy documents and/or submissions in court cases.

- *Bus that burdens*
- *Power that Plunders*
- *Power that Paralyses*
- *Memorandum before Rajadhyaksha Committee to amend laws on Electricity*
- *Memorandum before Era Sezhyan Committee on Life Insurance*
- *Memorandum on proposed Bill on Insurance Regulatory Authority*
- *Memorandum on Institution of Insurance Ombudsman*

The role of consumer groups should not be restricted to appearance before the regulatory authority on tariff fixation. Their role has to be larger, and must include setting stricter standards and labels on electrical appliances; formulating differential tariffs for working and non-working days, and peak and lean hours; providing extra incentives for energy conservation, environment protection, etc. This is not to underestimate their immediate role in terms of ensuring availability and quality of electricity.

onclusion

The cost of inefficient and uneconomical operations of utilities should not be transferred to consumers in terms of higher tariff. Consumers should be protected against unlawful gains by dishonest consumers. Losses on account of transmission and distribution beyond an optimum level should not be allowed to enter the tariff fixation. Competition should be encouraged among functional areas of generation, transmission, distribution, and supply so that the ultimate consumer becomes the beneficiary.

Rural Electrification Corporation, New Delhi

B S K Naidu

Regulatory reforms: expectations of rural energy and renewable energy sectors*

Transition to a liberalized environment: experiences and issues in regulation 228-232

Introduction

Electric power reforms in India seem to focus on tariff policy in view of the financial bankruptcy of the SEBs (state electricity boards). However, tariff regulation can only be one of the instruments of the regulatory mechanism that can bring about reforms in the power sector and cannot be an end in itself. The regulatory commissions are expected to comprehensively look at the entire gamut of power sector performance and effect reforms in a holistic manner aiming at appropriate 'development management' of the sector.

Power sector development in India since Independence

In the Indian scenario of power engineers, bureaucrats, and back-seat driving politicians, what we have achieved in the 50 years since Independence is quite intriguing.

- The power sector has expanded its installed capacity from less than 1500 MW to more than 90 000 MW. But, with a population of nearly one billion, the per capita consumption remains less than one unit per day.
- Of the 420 billion units generated in 1998, nearly 100 billion units were lost in transmission, distribution, and theft – an amount that would be the generated power of many nations around the world.
- Energy and peak demand continue to outstrip the supply – present energy shortage is 8% and peaking shortage, 11%.
- India has a hydro-thermal mix of 25:75 against a desirable mix of 40:60. The poor hydro-thermal mix has led to accelerated exhaustion of the fixed inventory of fossil fuels; atmospheric pollution and environmental pressure; frequent load shedding; fluctuations in voltage and frequency; backing down of thermal leading to low plant load factor and efficiency; constrained load-carrying capacity of the grid; and poor grid economy. Present peaking power shortages could have been totally eliminated with the same installed capacity under the same investment, had

---

* The views expressed in this paper are that of the author and do not necessarily reflect those of the organization he represents.

preference been given to the development of more hydro, leading to a judicious hydro–thermal mix.

- Annually, the thermal plants in India generate 75 MT (million tonnes) of fly ash, 290 MT of CO_2, 2.25 MT of SO_2, and 1.71 MT of NO_x.
- Only 2000 MW of nuclear power has been developed, against the expected 10 000 MW by the year 2000.
- Non-conventional renewables are limited to little over one per cent of the installed capacity mix.
- The pricing mechanism has led to a situation whereby, on an average for the whole country, tariff provides for only about 78% of the cost of supply of power. Allowed to proceed unchecked, this approach has led to an annual loss in the industry of about 100 billion rupees, equivalent to a negative RoR (rate of return) of 17%. Disappointingly, the deterioration took place even during the period 1992–97 when the private power policy was in place. The annual loss has increased from 47 billion to 100 billion rupees; the RoR reduced from –12.7% to –17.9%; and the tariff coverage of cost of supply reduced from 82% to 79%.
- India is highly energy inefficient, generating four units of electricity for an end use of just one unit – nearly 25% being the T&D (transmission and distribution) losses and 66.6% being the end conversion losses in several sectors like irrigation pumps.

All this reflects on the poor 'techno-economic–environmental–operational ethos' of our power systems.

Rural energy scenario

The rural energy scene in India is dismal. Nearly 400 million people in 77 million households have no access to electricity. Nearly 85 000 villages are not yet electrified. Of these, over 18 000 are remotely located and have no hope of grid extension for many decades to come, as it would be grossly uneconomical to extend the grid. No appropriate survey of these villages has been done for identifying the local sources of energy and load growth potential for decentralized electrification through distributed generation.

Villages hardly get eight hours of supply in a day, with voltage dipping as low as 130 V against the optimum 230 V. The problem of low voltage is acute in many areas of rural distribution. This has resulted in the burning out of motors practically once in every two years. The estimated expenditure for repair of motors alone may well exceed 3 billion rupees per year. The corresponding expenditure on failure of transformers due to overloading may be around 10 billion rupees annually. The standard voltage adopted in India for distribution of power is 11 kV which is transformed to 415/240 V by the use of distribution transformers (nearly 2 million in service). The transformer failure rate in India ranges between 9%–20% in the various states.

With nearly 12 million pumpsets (one for every 100 Indians) connected to 40 000 MW load, agriculture consumes one-third of the electricity provided at a highly subsidized tariff. Over 60% of the pumpsets are operating at an efficiency as low as 28%.

Rural electrification issues

The rural feeders in the distribution system are mainly responsible for the high T&D losses. Fifty per cent of the sale of power goes to LT (low tension) consumers, contributing to very high T&D losses. Line losses attributed to the LT network are as high as 42%, which indicates very heavy technical losses. The technical losses in the urban system are also high, but due to lack of proper metering all losses are appropriated on the rural side. This points to the need for detailed examination of technical losses and pilferage in urban as well rural systems.

Technologically advanced measures like the use of energy-efficient amorphous metal core transformers and completely self-protected transformers; installation of LT switched capacitors, voltage boosters, and single phase supplies; optimization of the low-voltage/high-voltage ratio for the distribution system, etc., can help in loss minimization. System improvement may be made mandatory with state-of-the-art technologies and energy-efficient equipment (encouraging capitalization of losses) leading to energy conservation.

Metering below 132 kV level, which is almost never done, should be made compulsory to facilitate energy audits and control of losses. Without universal metering and tariff setting related to energy consumption (however subsidized the rate), it is nearly impossible to improve the power system. The SEBs should be given the authority to cut off supply to inefficient pumpsets not conforming to the norms stipulated.

Sub-transmission and sub-distribution lines have been developed in a haphazard manner on a segmental basis rather than an integrated approach. There is a need for mandatory system studies for system development with optimized benefits. System inefficiency cannot be passed on to the clients for payment.

Rural electrification being non-remunerative, it would be challenging to attract and motivate private parties to work in rural areas. The ESCOs (energy service companies) or IRPPs (independent rural power producers) can be motivated to work in rural areas if at least 70% of their sales are from productive use of electricity like small-scale industries in the villages and the remaining 30% from the domestic sector.

The village electrification programme, intensive household electrification in the villages, and the pumpset energization programme which remain to be completed need to be pursued even in the changing environment. These being non-remunerative sectors, the mandatory mechanism for their objective and social purposes will have to be properly built into the reform programme.

enewable nergy issues

The MNES (Ministry of Non-conventional Energy Sources) has circulated guidelines for the development of renewable energy systems as environment friendly alternatives to the conventional power system (professing concepts like wheeling, banking, buy-back, and third-party sale of power). Twelve Indian states have followed these with some modification, and have announced state level policies comprising incentive packages in the renewable energy sector. Regulatory authorities may support the MNES initiatives in developing grid quality power from renewables as well as decentralized electrification through local renewable sources of energy like small hydro, solar, wind, biomass, and hybrid systems.

Debates continue between monopolistic SEBs and small private promoters of power, for example, state governments tend to charge water royalty on private small hydro projects, which do not cause any environmental distress, even though no royalty is charged on state sector hydro projects, thermal power stations that consume 3000 billion litres of water annually, and irrigation projects even for consumptive use.

Though the private sector participation policy has been in place for the last seven years, very little headway has been made in respect of hydro projects in the private sector. Delays by both the parties are only retarding national growth. Revenue that can be earned by the government through income tax and economic growth through multiplier effect can be much more. Both sides take extreme positions, for example, the insistence of private parties on deemed generation payment and the refusal of state governments to allow third-party sale, etc. For the developer, quick and efficient generation is much more valuable than the negotiating expenses. The 'penny wise, pound foolish' approach should be shed.

Expectations from the regulatory reforms

- Regulation of generation/transmission tariff
- Improvement of quality of supply: reliability, frequency/voltage, etc.
- Creation of a grid discipline: techno–economic–environmental–operational ethos
- Creation of a financially viable and commercially sustainable power system
- Energy conservation and loss prevention
- Optimization of the resource mix
- Sustainability: resource based/integrating environmental concerns
- Reduction in theft/corruption
- Consumer protection
- Investor's confidence building
- Ensuring of competition, innovation, etc.
- Transparency and consistency

Present and future strategies

To strategize power sector reforms, a bifocal approach must be adopted. The planning horizon has to extend from 5 years to 50 years.

In the next 50 years, the population of India will double to two billion and the aspiration of the people may expand several-fold. With the present rate of consumption, India and the rest of the world will not be left with any oil or gas by 2050. Even coal reserves are not infinite. The global consensus is that carbon dioxide levels of today are to be immediately brought down to 60%; otherwise there may be a major climatic shift with the coastal populations being the worst affected.

Keeping all this in view, it is the need of the hour to place hydro and all other non-conventional renewable energy sources on the proper policy mandatory framework as the energy of the future for sustainable development.

TERI,
New Delhi

Ajay Mathur

Regulating technological change in the electricity sector: thinking beyond today

Transition to a liberalized environment: experiences and issues in regulation 233-237

Introduction

The Electricity Regulatory Commissions Act, 1998 sets the legal framework for the establishment of independent regulatory commissions at the centre and in the states. The main role envisaged for these commissions is the establishment of appropriate tariffs for various classes of electricity consumers, as well as for electricity sales between generating and transmission companies both within a state and between states. The mandate of the commissions is to ensure fair pricing that protects the economic interests of the suppliers and the users. The mandate also calls upon the commissions to promote energy efficiency and ensure environmental compliance. This mandate is driven by the current financial crisis brought about by the economic non-viability of the SEBs (state electricity boards), largely due to non-remunerative tariffs and organizational inefficiencies. The current concern of all stakeholders, particularly those associated with electricity supply, is the establishment of institutional frameworks and methodological processes that allow the sector to make the transition towards financial viability. This has lead to the ongoing process of unbundling (and possibly privatizing) the SEBs into generation, transmission, and distribution companies. Much effort is also being invested into the ways and means to devise electricity transfer prices between these companies, and the sale prices between the distribution companies and the end-users.

In the quest for ensuring financial viability of the sector, the issue of protecting the medium- and long-term interests of electricity users has taken a back seat. In fact, the only approach that has been brought forward for discussion is the application of an energy efficiency deflator to tariffs after they have been set at a viable level. The purpose of this paper is to expand the debate concerning ways and means to protect the longer-term interests of the consumers. Indeed, tariff decreases (brought about by an efficiency deflator) can again lead to financial non-viability unless accompanied by appropriate technological change. This paper highlights the regulatory processes that must be put into place in order to meet the goal of consumer protection while maintaining the financial viability of the supply industry.

To accomplish this goal, the regulatory process needs to address the issues of access, generation mix, and global cost minimization. Current strategies for enhancing access (particularly that of rural households) have relied on subsidized grid expansion and electricity supply. Electricity service to rural households continues to be poor because of the high cost (and high losses) associated with both infrastructure development and energy supply. This implies that alternative, less-costly methods for enhancing energy access (such as distributed generation) need to be promoted. At the same time, the current planning process favours investments in enhancing generation facilities even when investments in use conservation are economically more efficient. This investment divide needs to be bridged. Finally, over the past few decades, there has been an increasing emphasis on thermal power in the country's generation mix. This is primarily because of the lower capital costs and shorter gestation period of thermal power projects. However, it has resulted in a loss of diversity in the generation mix implying reduced capacity to manage future uncertainties (of saturating efficiencies, environmental constraints, and resource and transportation limitations). Consequently, diversity optimizing strategies (to balance costs with future uncertainties) are needed.

The three regulatory goals that emerge from this discussion are (1) ensuring IRP (integrated resource planning); (2) enabling distributed generation; and (3) managing diversity of the generation mix. The rationale for each of these goals, and the issues involved in their implementation are discussed below.

Integrated resource planning

Integrated resource planning encourages the electricity supply companies to weigh the relative benefits of enhancing electricity generation and enhancing end-use efficiency. This approach, therefore, reduces the global investment needs of the economy, and keeps the costs to consumer in check. The process would encourage investment by the electricity supply industry (through what is called the DSM [demand-side management]) in energy-efficient end-use devices such as solar water heaters, compact fluorescent lamps, and efficient appliances. The by-product of the process would be lower environmental emissions because of the constrained growth in electricity generation.

However, the implementation of the IRP process in the unbundled industry is complex. The distribution company will shy away from making investments in end-use efficiency since it does not gain the associated benefits of avoided investments in generation capacity. The benefits of a DSM programme would only accrue to the electricity supply industry if the investment decisions of the generation company and the distribution companies are meshed together, and linked with the electricity tariff for the consumer. This linkage can only occur at the regulatory commission. However, the analytical framework within which this decision-making would occur needs to be developed. This IRP framework would need to transparently convey to all the stakeholders the conditions in which the DSM is in the best economic interest of each of them. It would also need to build consensus on performance norms and benchmarks for future years to provide the requisite signals for cost reduction to the electricity supply industry.

Distributed generation

It does not make economic sense to supply electricity to rural communities from centralized generation plants through long distribution lines. It has been shown, time and again, that local electricity generation and distribution is more cost-effective under most circumstances. This highlights the need for enabling the establishment of local grids and distributed generation. Operationalizing such systems is, however, difficult from a regulator's perspective. The first issue is whether the local grid operator would be an independent franchisee or a sub-franchisee of a larger distribution company. In either case, the regulator will have to contend with the issue of appropriate user tariffs for this local grid. This is because while the electricity cost from distributed generation / local grid would be less than that from grid extension, it would still be higher than that for urban and industrial consumers. Consequently, a framework to manage financial flows is needed which would allow cross-subsidization of local grids by the urban and industrial distribution systems. Else, the regulator would have to set higher tariffs for rural consumers so as to make the local grid operation viable.

Diversity of the generation mix

The bulk of the generating capacity today consists of pulverized coal boiler and sub-critical steam turbine technologies. The strategy of focusing on this technology has resulted in a number of benefits, such as lower capital and operating costs, higher availability, and large-scale transfer of learning and experience. The disadvantage is that this technology is now reaching the limits of conversion efficiency, and any further increases in efficiency would be possible only with new technologies such as super-critical boilers and integrated coal gasification / combined cycle power plants. The current technologies are also facing limits to cost-effective compliance with environmental regulation. Further tightening of environmental norms would lead to major increases in electricity cost, unless new technologies (including many renewable energy technologies) are adopted. It is clear that in the years ahead, constraints on coal supply and its transportation, as well as stricter environmental norms would force the introduction of new technologies. The learning associated with new technologies is costly, and occurs over a relatively long (5–10 years) period. This makes sudden changes in the generation mix extremely expensive for the consumer. Therefore, it is better to promote diversity in generation technology with a view to enhancing the (cost and technical) performance of newer technologies. This approach of diversity optimization weighs current costs associated with new technologies against the costs of uncertainties in the operating environment in the years ahead.

The regulator would need to devise a framework to manage generation diversity. The main goal of this framework would be to encourage the 'coming of age' of new technologies. An interesting approach has been the NFFO (non-fossil fuel obligation) in the UK. Under this programme, a set-aside for electricity from renewables has been mandated. This set-aside percentage is procured competitively; in the process, the price of wind electricity has dropped from about 8–9 pence to about 4 pence over six years. The regulator's framework for generation diversity would also need to address the issue of cross-subsidization of the (initially) high-cost electricity from the new technologies. This subsidy could be drawn from the overall pool of generated electricity, or could be earmarked by the government (as is currently being done by the Ministry of Non-Conventional Energy Sources for electricity from renewables).

Future strategy

There is a need for the development of three sets of analytic frameworks by the regulatory commissions to protect the medium- and long-term interests of the electricity consumers. The issues that would need to be addressed by the regulatory commissions in establishing these frameworks range from issues of cross-subsidization to those of long-term benchmarking, financial engineering, and institutional interfacing.

Pilot projects in specific regions would need to be developed and implemented in order to understand the trade-offs involved in implementing these frameworks. Local grids in

Orissa, wind electricity in Gujarat, and the DSM in Haryana could be pilot projects initiated and coordinated by the regulatory commissions in those states. Within these pilot projects, the capacity to plan and implement the regulatory goals could be built up in the regulatory commissions and in the other stakeholders, such as the unbundled companies and electricity users. The experience would provide an indication of the complexity in managing these frameworks, the time required to initiate them, and the benefits that would accrue from them.

United States
Agency for
International
Development,
New Delhi

Jim Bever

Regulation in India: the next step

Transition to a liberalized environment: experiences and
issues in regulation 238-239

The process of modifying long established political and governmental institutions and practices such as those in the electrical power sector and the regulatory sector, whether in the US or in India, is usually accompanied by varying levels of commitment, enthusiasm, and tension. India should be commended on the bold and courageous steps it has taken over the last few years to establish economic regulation for utilities.

India's landmark legislation includes the Electricity Regulatory Commissions Act, 1998 and the state legislation of Orissa and Haryana. The states of India hold tremendous opportunity for creative and powerful competition to attract industry and for growth thereby. The regulatory work that is under way is fundamental to reassuring investors, both domestic and foreign, about the rule of law and predictability for their investments. That is also fundamental to the evolution of efficiency in India, if India is to be a global economic powerhouse in the future.

Chapter six of the Electricity Regulatory Commissions Act, 1998 refers to electricity generation, transmission, distribution, and supply being conducted on commercial principles. This means that tariff reform is required in this country and all too often it is felt that such reform is the panacea. In fact, it is not. It is necessary, but not sufficient by a long shot. Part of the problem and the challenge is that people have to pay for those tariffs and for that power. While this is not new, price elasticity of demand effects are not kicking in, except in rare exceptions. Therefore, there are very large predictions and forecasts of future demand in India which legitimately is needed for economic growth on a per capita basis, but cannot be justified based on forecast of demand in the current economic situation with such high administrative and technical losses. There is no shortage of energy or financial resource mobilization capability in India, but there has been a shortage of political will and courage. Thus regulatory commissions are fundamentally important in the structure of the future of India because it is through the independence of the regulatory commissions that political will can move forward. One way to maximize the independence of regulatory commissions is to make them financially independent of the government budget process. This is a difficult step.

In the US, the nuclear regulatory commission, which was formed after the Three Mile Island disaster, was based on its own sources of funds. So it does not have to depend on the state government budget or the federal budget per se for its own income sources, or if it wants to hire people, establish new facilities, or modernize its data capabilities. Future regulations and legislation in India could include such a feature.

Regulators in Haryana and West Bengal and in the states that will adopt regulatory reform will need, on a regular daily basis, access to cutting-edge decisions that have been made in other regulatory bodies outside India, or more importantly within India. This means quick electronic and hard copy access to cases, precedents, new regulatory guidance, and legislation. This is a fundamental institutional building block. Secondly, in-service training is needed for senior regulators and for those on the staff who need analytical tools to work with the consultants hired from within the Indian economic and engineering capabilities and legal fields. Finally, a support group is needed while working in new areas. This group can help underwrite, to the extent that their financial means allow, the linkage of regulators and their staff from Haryana, Orissa, and other states and those of the Central Electricity Regulatory Commission into a group of regulators who can share best practices and give courage to one another.

Australian Competition and Consumer Commission, Dickson ACT, Australia

Allan Asher

Recent reforms in the Australian electricity supply industry

Transition to a liberalized environment: experiences and issues in regulation 240–249

Importance of electricity reform

Traditionally, the ESI (electricity supply industry) in most states and territories of Australia has consisted of vertically-integrated, publicly-owned monopolies. State governments and their electricity authorities have largely invested in new generation. Electricity prices were set by state governments to cover the industry's costs plus any return required by the governments as shareholders. These prices reflected a lack of competitive pressure and therefore a lack of impetus to improve efficiency and optimize costs.

As a result of these policies, it became evident in the 1980s that the ESI was characterized by excess capacity, overstaffing, and pricing inefficiencies (resulting from cross-subsidies). The ESI has since undergone significant changes to improve performance. Early reforms focused on improving efficiency, such as increasing labour productivity, while recently the emphasis has been on administrative and structural reforms, designed to introduce competition into the ESI.

The importance of competitive reform of the ESI is underscored by the significant role the industry plays in the Australian economy, as well as the size of potential benefits that are likely to accrue from the successful implementation of the reforms.

The ESI is one of Australia's largest economic activities. As an infrastructure industry, it ranks third in terms of its contribution to the gross domestic product (2.1% in 1996/97), after communications and road transport. It is estimated that Australian energy assets are worth 75 billion dollars (Barney 1998).

Electricity is an important input for all Australian industries. On an average, electricity comprises 0.3%–6% of industry costs (considerably more for energy-intensive industries like smelting and non-ferrous metals) (BIE[1] 1996), and in total it represents 18% of Australia's energy needs (ABARE[2] 1997).

---

[1] Bureau of Industry Economics

[2] Australian Bureau of Agriculture and Resource Economics

Thus, the successful introduction of competitive reforms in the Australian ESI is a key to providing strong competitive incentives to participants to improve the efficiency of their production, resource allocation, and investment decisions, and to minimize costs. These benefits are not limited to the ESI because electricity influences the ability of firms to compete both domestically and internationally. Benefits are likely to be distributed broadly throughout the economy through lower input prices to the Australian industry, lower prices to the end-use consumers, and more efficient use of society's resources.

Recent competition policy reforms

Electricity industry reforms gained national prominence at the July 1991 Special Premiers Conference, when the COAG (Council of Australian Governments) agreed to the introduction of the NEM (national electricity market) as part of microeconomic reform of government enterprises. At this meeting, the COAG agreed to the establishment of the NGMC (National Grid Management Council) to advise it in relation to the development of an NEM, and develop the NEM's market and trading arrangements.

A major step in extending the reach of the competition policy to previously sheltered sectors of the economy such as the ESI, was the commissioning in late 1992 of the report of the Independent Committee of Inquiry into National Competition Policy (August 1993). At the COAG meeting of April 1995, the Heads of Government signed agreements to implement the national competition policy reform package. The package included extending the competitive disciplines of the TPA (Trade Practices Act) to state government business enterprises and reaffirmed COAG's July 1991 commitment to establish an NEM.

The agreed package of reform measures has provided guidance in relation to the restructuring of the ESI. They have also linked competition payments to the implementation of microeconomic reforms thereby providing an incentive, in addition to identified efficiency benefits, for state governments to pursue reform.

Recent reforms in the electricity supply industry

The recent focus of the ESI has been on administrative and structural reforms.

Administrative reform of the ESI covers a range of policy changes such as the corporatization of electricity utilities, the creation of a competitively neutral operating environment (that is, separation of commercial and regulatory functions, and imposition of tax equivalence and dividend payments), and the establishment of independent pricing authorities. Administrative arrangements have also dealt with transitional issues including the franchising of some customers to specific retailers and vesting contracts for generators.

The extent of structural reform of the ESI has differed between jurisdictions but has generally involved the identification and separation of the more contestable segments of the industry (i.e., generation) from the natural monopoly elements of the industry (i.e., transmission and distribution). In some jurisdictions, structural reforms have also increased competition by splitting the various activities of the industry into separate competing companies (e.g., generation). In addition, a number of generation and distribution companies have been privatized. These structural changes have often been accompanied by changes in the regulatory arrangements.

The reform programmes undertaken in each of the jurisdictions are briefly outlined below.

New South Wales

The New South Wales electricity market has been operating as a wholesale competitive electricity pool since 10 May 1996. The operation of the New South Wales market is governed by the existing code, which binds all market participants. Regulation of the industry is largely carried out by the market operator, which is a ring-fenced entity within TransGrid. The ACCC (Australian Competition and Consumer Commission) granted New South Wales interim authorization for its market arrangements on 24 April 1996.

New South Wales currently has three state-owned generator companies with a separate transmission company and separate distribution/retailer companies. A number of private sector retailers from the interstate have entered the retail market.

An independent regulator, the Independent Pricing and Regulation Tribunal, oversees the regulation.

The New South Wales Labor Government has publicly debated its intention to sell New South Wales electricity assets. However, assets will be not be privatized prior to the state election, due in March 1999.

Victoria

The Victorian state electricity market has been operating as a wholesale competitive electricity pool since 3 July 1994. The operation of this market is governed mostly by the existing VicPool Rules with system security being governed by the System Code and metering being governed by the Wholesale Metering Code. Regulation of the industry is carried out primarily by the Victorian Office of the Regulator-General, whose responsibilities include the issuance of generation, transmission, distribution, retail and market-operation licences, and the regulation of certain prices, such as transmission and connection charges. The Victorian arrangements are currently being operated under a statutory exemption from the provisions of the TPA.

Victoria has five privatized generator companies, a separate privatized transmission company, and five privatized distribution/retail companies. Several new retailers have also entered the market. The one remaining publicly-owned company is the generator, Ecogen.

Australian Capital Territory

In the ACT (Australian Capital Territory) the functions of the power and water utilities have been merged into a single corporation, the ACTEW (ACT Water and Electricity Authority). The ACT has also established an independent regulator to oversee water and electricity tariffs.

In October 1998, the ACT government outlined its intention to privatize the ACTEW.

Queensland

In 1997, AUSTA Electric's generation portfolio was split into three competing state-owned generators: Stanwell, Tarong Energy, and CS Energy. Further, the seven regional electricity boards were corporatized and three retail corporations – Energex, Ergon Energy, and Omega Energy – were created, based on aggregated distribution territories. In March 1998, Ergon and Omega merged to enable them to compete more effectively with Energex and interstate retailers.

The Queensland Competition Authority has been established as an independent regulator.

South Australia

The South Australian reform agenda has seen the creation of a separate electricity generator company, Optima Energy, with transmission, distribution, and retailing being handled by the ETSA (Electricity Trust of South Australia) Corporation. Transmission, however, will be ring-fenced.

In February 1998, the South Australian Government announced its intention to privatize ETSA and Optima Energy.

South Australia is also proposing to establish an independent jurisdictional regulator to oversee the ESI.

Tasmania

In July 1998, the HEC (Hydroelectric Corporation) was restructured to form separate generation, transmission, and distribution/retail businesses. The previous Tasmanian government also announced that it was considering selling the distribution/retail business (Aurora Energy) and the transmission network (Transend Networks), and potentially leasing the HEC's generating assets. However, the defeat of the government may well halt these privatization plans.

The previous government also announced plans to commission an interconnector, Basslink, between Tasmania and the mainland. This commitment to the Basslink project has now been affirmed.

New regulatory arrangements have been put in place in Tasmania. The responsibility for the investigation of the pricing policies for Aurora, Transend, and the HEC was transferred to an independent regulator, the Office of the Electricity Regulator, in July 1998.

Western Australia

The corporatized entity Western Power was formed in January 1995, when the former State Energy Commission of Western Australia was broken up into separate electricity and gas businesses – Western Power and Alinta Gas.

This corporatization did not conform to the structure followed in the other jurisdictions. It did not involve a vertical break-up into separate generation, transmission, and distribution/retail companies, or a horizontal break-up of the generation and distribution/retail sectors. In Western Australia, Western Power retains responsibility for generation, transmission, and distribution/retail.

Since 1997, access to Western Power's electricity transmission and distribution networks is progressively being phased in to promote competition between suppliers. Under the open-access regime for electricity transmission, 33 of Western Power's largest customers are able to negotiate directly with the electricity supplier of their choice, subject to their existing contracts.

The Office of Energy oversees regulatory issues in Western Australia.

Northern Territory

In the Northern Territory, both electricity and water are provided by an integrated utility. Reform in the Northern Territory is, however, an issue that is being actively considered.

National electricity market

The structural and regulatory reforms at the jurisdictional level underpin what is arguably the most significant ESI reform undertaken in Australia – the commencement of the NEM. The NEM is a competitive wholesale electricity market combined with an open-access regime for the use of transmission and distribution networks in the participating jurisdictions of New South Wales, Victoria, the ACT, South Australia, and Queensland.

As a step towards integrating state markets, the NEM 1 was formed on 4 May 1997. The NEM 1 is the harmonization of the wholesale electricity markets of New South Wales, Victoria, and the ACT with the objective of bringing these jurisdictions closer to an easy transition to the NEM.

In late 1996 and early 1997, the governments of the ACT, New South Wales, Queensland, South Australia, and Victoria lodged applications with the ACCC

- to authorize under Part VII of the TPA, 1974 the proposed national wholesale electricity market arrangements
- to accept under Part III A of the TPA, an access code for the electricity transmission and distribution networks.

The applications relate to a single integrated document, the NEC (National Electricity Code), and were lodged by the operator of the wholesale market, NEMMCO (National Electricity Market Management Company) and the code administrator, NECA (National Electricity Code Administrator).

The NEC details market and institutional arrangements relating to market rules, system security, network connection, network pricing, and metering. The NEC also contains the rights and obligations of the wholesale market participants.

The NEC has been endorsed by the participating jurisdictions, which have also agreed to enact cooperative legislation, the National Electricity Law, to implement the regulatory arrangements that support the effective operation of the NEC. This legislation enables the NEC to have identical force and effect in the participating jurisdictions.

The NECA will administer and enforce breaches of the code and NEMMCO will manage the operation of the market and power system security. The NECA and NEMMCO are incorporated under the Corporations Law and their members are the participating jurisdictions. The objectives, powers, and responsibilities of both companies are defined in the NEC. NECA's regulatory powers do not extend to safety, the environment, or customer franchise pricing. These three areas will continue to be regulated by the individual jurisdictions.

While the NEC is a single document and many of the issues are closely related, the authorization and access code applications are assessed against separate criteria and require separate decisions. The ACCC's consideration of these applications is discussed here.

Authorization

The applications for authorization of the NEC and all conduct to be engaged in under it were made to the extent that such conduct may contravene sections 45 or 47 of the TPA.

The ACCC's assessment for the purposes of authorizing the NEC indicated that significant public benefits, in the form of greater efficiencies, lower input costs for other industries, lower prices, and better service delivery to end-users, may flow from the NEC arrangements. However, the assessment also highlighted a number of deficiencies which will influence the effectiveness of competition and hence impact on the balance between public benefit and anti-competitive detriment.

The ACCC imposed conditions to be met prior to market commencement in relation to

- provisions in the NEC that have been justified due to current market immaturity (the price floor, the price cap, short-term forward market, and market intervention provisions)
- a requirement that NEMMCO monitor the market daily in order to ensure that all trading is in accordance with the NEC
- jurisdictional derogations that extend beyond the transition period or which do not phase out
- technical derogations for older plants.

The applicants lodged a number of NEC changes which addressed these concerns.

One of the issues raised which goes beyond the subject matter of the NEC and the scope of the applicants' responsibilities is the structure of the wholesale market. Analysis of market structure by ABARE indicates that the NEM is characterized by a significant degree of market concentration, particularly in South Australia and New South Wales. The ABARE found that the current market structure is such that large generation portfolios in South Australia and New South Wales would be in a position to dominate particular segments of the market. The modelling results indicate that strategic behaviour during periods of high demand could lead to significant increases in electricity spot prices. All generators in the NEM are estimated to benefit from the higher operating surpluses resulting from strategic behaviour by major players. Hence the ACCC recommended that the New South Wales and South Australian governments consider further structural reform.

The issue of market structure is not only crucial at the commencement of the NEM but will be of ongoing interest, particularly in respect of possible reintegration of firms participating in the NEM. Concerns also include possible mergers within each segment of the market, arrangements whereby NEM participants operate in upstream or downstream sectors (such as a generation company also operating a retailing business), and merger proposals between different energy suppliers (such as a generation company buying a gas company).

Access The access code is a subset of the broader NEC. It focuses on network connection, investment, and pricing, and excludes those parts of the NEC relating to the operation of the wholesale market. In general, the access code allows generators and large electricity users (e.g., smelters) to participate in the wholesale market and to separately contract for transport on the networks.

In terms of an access regime as envisaged in the competition policy reforms and Part III A of the TPA, the access code will largely be irrelevant for most households. Most small- and medium-sized electricity users will continue to purchase their electricity through retailers which will bundle the wholesale commodity and transport costs. The code's impact on smaller users will largely be felt through the regulatory mechanisms which set prices for the monopoly networks, irrespective of whether they are third-party users or retail customers.

The ACCC's assessment of the access code is based on statutory requirements which allow the ACCC to accept an access code, while keeping in mind the legitimate business interests of facility owners, the interests of access seekers, and public interest (including its impact on competition, the competitiveness of Australian businesses, the environment, social welfare, regional development, and occupational health and safety). The ACCC is also allowed to consider any other matters it thinks relevant.

The ACCC concluded that, in general, the NEC provides an acceptable framework for parties to gain access to and use of electricity transmission and distribution networks. However, the ACCC determined that certain features of the access code do not meet the criteria in Part IIIA of the TPA and regulations for an acceptable access code. Before it was willing to accept the access code, the ACCC sought to resolve its major concerns relating to

- establishing a better balance between regulatory flexibility and price certainty by requiring that jurisdictional regulators are independent of the executive government

- providing regulators with effective powers to
  - publicly release information gathered in the price setting reviews
  - determine the accounting and functional ring-fencing guidelines for a network's monopoly and contestable activities
- improving the efficiency and location signals of transmission network prices
- improving the negotiation arrangements for network connection by
  - allowing access seekers to construct and operate their own wires, thereby providing them with the option to bypass the incumbent networks
  - making it clear that access seekers can use the NEC's dispute resolution procedures, thus providing a short circuit to any unduly protracted negotiations
- limiting the extent of non-uniform jurisdictional arrangements which persist beyond the year 2000, for example
  - Victoria's arrangements to facilitate the privatization of its transmission network operator (PowerNet Victoria)
  - South Australia's attempt to use average, not cost-reflective, prices for their transmission network.

The ACCC's assessment also highlighted a larger number of other deficiencies which impact on the balance of the interests of network owners, access seekers, and public interest. Some of these deficiencies involve complex issues and will take some time to resolve. Other deficiencies can easily be handled through the normal code change processes.

On 10 December 1997, the ACCC issued a Final Determination conditionally authorizing the NEC application. The ACCC accepted the NEM Access Code on 16 September 1998, after the commission's major concerns were addressed.

The NEM commenced on 13 December 1998 including the ACT, New South Wales, South Australia, and Victoria. Queensland will physically join the NEM once an interconnector to New South Wales is constructed, which is expected in the year 2000. Tasmania is expected to join the NEM once the Basslink interconnector is commissioned. Neither Western Australia nor the Northern Territory are anticipated to join the NEM because of their isolation from the eastern states.

Regulation of transmission revenues

The ACCC will assume responsibility for the regulation of transmission network revenues in the NEM on a progressive basis, commencing from 1 July 1999. The ACCC will oversee a transmission revenue regulatory regime using a revenue cap methodology based on CPI-x or some incentive-based variant of CPI-x. The Code provides guiding principles on the operation of the revenue cap that the ACCC must take into account, such as

- an equitable allocation of efficiency gains between users and owners of the system
- providing owners with a sustainable commercial revenue stream
- prevention of monopoly rents
- fostering efficient investment within the transmission sector and upstream and downstream of that sector
- fostering the efficient use of existing infrastructure
- promotion of competition in upstream and downstream markets
- providing reasonable certainty and consistency over time of regulatory outcomes
- reasonable recognition of pre-existing government policies regarding transmission asset values, revenue paths, and prices.

As national regulator for transmission, the ACCC is to be responsible for developing national guidelines and rules for application of those guidelines. The ACCC is currently producing a 'Statement of Regulatory Intent' which will establish guidelines as to how it will exercise its power in this area.

References

ABARE. 1997
Energy, Australian Energy Consumption and Production, Historical Trends and Projections to 2009–10
Canberra: Australian Bureau of Agriculture and Resource Economics. 181 pp

Barney S S. 1998
The Australian Electricity Industry
Sydney: Salomon Smith Barney. 156 pp

BIE. 1996
Electricity 1996, International Benchmarking
Canberra: Australian Government Publishing Service. 189 pp

Summary of question and answer sessions

Transition to a liberalized environment: experiences and issues in regulation 250-252

The effectiveness of the SERCs (state electricity regulatory commissions) set up under the provisions of the ERC (Electricity Regulatory Commissions) Act, 1998 was debated at length. It was pointed out that since the SEBs (state electricity boards) have been created under the Electricity (Supply) Act, 1948 and do not require a licence from the respective the SERCs to engage in the business, the effectiveness of the SERCs would be limited. The SERCs cannot revoke the licence or the authority of the SEB to engage in the business of electricity supply. Further, since the SERCs created under the ERC Act only regulate the tariff, the issues relating to quality of supply and improvement of services would remain outside their jurisdiction. However, contrary views were also expressed. Some experts felt that even if the SERCs are established under a separate state legislation, they would not be able to revoke the licence of a company as the transmission and distribution companies are being established as monopolies. In the context of issues relating to quality of supply, it was mentioned that the same could be incorporated as a part of a performance-linked tariff mechanism.

The issue of regulating the interstate sale of power and the power purchase process was discussed. It was pointed out that as far as possible the SERCs would not regulate the generation business. They would only regulate the power procurement process for a licence within the state and ensure that the overall process is fair and reasonable. They are not expected to go into the nitty-gritty of the power purchase negotiations.

The need and importance of uniformity in the legal framework for the CERC (Central Electricity Regulatory Commission), the SERCs, and all regulatory bodies were highlighted. Most of the experts felt that it was an excellent suggestion and there was a broad consensus on the issue.

The power reforms in England and Wales were discussed and debated at length. The decision in Scotland to not go in for unbundling was questioned. It was pointed out that political convenience was one of the major factors influencing the decision. Further, the difference in the objectives of the programme and in the structure of industry as existent before reform were also cited. It was mentioned that industry in England and Wales was already split between transmission and distribution on one hand and distribution and supply on the other.

The process of ensuring efficiency in the power purchase process in the context of the regional electricity companies in England was discussed. Here it was mentioned that there is no simple mechanism to ensure efficiency and the best solution is to place pressure on companies by opening up the market to competition. In this manner, the companies will need to justify the power purchase to their customers in relation to the competitive choices available in the market. This process can be complemented by putting price caps to ensure that inefficiencies in the system are paid for by the companies and not consumers.

The financial loss incurred by the SEBs in India was highlighted and questions regarding the profitability of the UK electricity industry were raised to provide a comparison. It was mentioned in this regard that the electricity industry has always been a profitable business in England though the level of profits has varied. One of the first decisions that the government took after deciding to privatize the industry was to increase the prices. This was done as it was not possible for it to continue subsidizing the customers as in the past and because it was important to ensure that the industry remained profitable to provide finance for future capital expenditure.

Questions regarding the methods for reducing the level of regulated tariffs in UK were put to the panel. The response in this context was that this has mainly been achieved through enhancing the operational efficiencies and not by reducing the profits. It was also pointed out that transmission loss has traditionally not been a problem in the UK.

The reform process in Orissa was discussed and questions regarding the benefits that have flowed to the consumers were put forward to the panel. It was pointed out that though the benefits to the consumers have been limited, they now have an agency that is trying to drive the utility to perform better. It was also mentioned that there was a possibility that the privatization process may lead to increase in tariff in the short run and the example of UK was cited to support the argument.

The structural model adopted in Orissa was debated and it was pointed out that the same could not be uniformly applied to other states going in for reform. Special characteristics of the Orissa system were cited and it was mentioned that there are a lot of lessons to be learned from the Orissa experiment.

It was also mentioned that the reform process requires a very careful consideration. Also a corporatization strategy has to be designed with due care and with a view on tariff.

Another important issue that was raised in relation to the Orissa reform process was the lukewarm response from private investors to the privatization of the distribution process. It was pointed out that out of an initial 16 interested investors, response for only three distribution zones could be elicited. In this context, the role of regulatory uncertainty was highlighted and debated. It should not be assumed that investment would flow in even if there were a problem in the system.

The role and functioning of the proposed power trading company was debated in view of the existing and proposed market structure in the country. Here it was pointed out that unless the procedures of contracting are settled with the CERC, it might be working at cross purposes.

The importance of maintaining a balance between the interests of the shareholders and customers was pointed out. It was mentioned in this regard that regulatory commissions have a critical role and function of ensuring that balance is maintained. It was pointed out that more thinking needs to go into the process and different options available should be evaluated in context of the circumstances and particular needs of different states.

Ports

Session 1 Regulatory framework

Session 2 Market structure

Session 3 Tariff setting

Session 4 Regulatory reforms: present and future strategies

■

Background paper
S Sundar and S K Sarkar

■

Regulation in the transition to liberalized economy
S Venkiteswaran

■

Australian port authority reform
Allan Asher

■

Transition to liberalized integrated infrastructure development
Nikhil Gandhi

■

Ports: market structure
R R Sinha

■

Indian ports: transition to a liberalized environment
Amal Chakravorty

■

Application of revenue yield price control to Victorian ports
Sohail Hasnie

■

Tariff setting: changes in port pricing
Swapan Chakrabarti

■

Regulation in the port sector
M P Pinto

■

Regulatory reforms: present and future strategies
Nikhil Gandhi

■

Summary of question and answer sessions

TERI, New Delhi
S Sundar and S K Sarkar

Background paper

Transition to a liberalized environment: experiences and issues in regulation 255-262

At present, India's port system comprises 11 major ports and about 140 operating minor ports. Around 90% of the sea-borne trade takes place in the major ports. The main commodities handled at the major ports during the Eighth Five-Year Plan were petroleum, oil, and lubricants (43%), iron (15%), coal (11%), coking coal (5%), and container cargo (9%). General cargo volumes were almost flat until 1990, reflecting a closed economy where import substitution policies limited commercial interchange with the outside world. With the adoption of trade liberalization measures by the GoI (Government of India) in the early 1990s, India's ports have witnessed significant increases in general cargo traffic, which is now approaching 10% of the overall traffic through the country's major ports.

There exists a mismatch between the existing capacity and demand for traffic in the ports system. As against a total capacity of 217 MT (million tonnes) as on 31 March 1997, the major ports handled 227.3 MT in 1996/97, resulting in pre-berthing delays and longer ship turnaround time. Indian ports continue to show lower productivity in terms of labour and equipment in comparison with efficient ports in the Asian region. The reasons are outdated equipment, poor training, low equipment handling levels by labour, etc.

Regulatory framework prior to March 1997

In India, the major ports are placed in Serial 27 under the Union List of the Constitution, and are administered under the MPTA (Major Port Trusts Act), 1963 by the GoI. Other ports are placed in Serial 31 of the Concurrent List of the Constitution and are administered under the India Ports Act, 1908. The other Acts applicable in the port sector are the Merchant Shipping Act, 1958, which describes the power of the regulatory authority (i.e., the Directorate General of Shipping), and the Dock Workers (safety, health and welfare) Act, 1986, which regulates the conditions of employment, service, and other matters relating to dock workers.

Under the MPTA, a port trust organization is established at each of the country's major ports. The central government appoints the board of trustees in each port. Major ports are not mere government agencies, but are legally independent entities functioning within a defined area. Ports are also entrusted with the performance of civic duties and functions, and have the power to raise funds for the furtherance of its activities by levying charges, fees, etc.

At the state level, the department in charge of ports or the SBM (State Maritime Board), which is being created through the state legislation, is responsible for formulating the waterfront development policies and plans, regulating and overseeing the management of state ports, attracting private investment in the development of state ports, enforcing environmental protection standards, etc. So far, Gujarat, Maharashtra, and Tamil Nadu have constituted SBMs.

Regulatory framework after March 1997

To augment and upgrade port capacity and to meet the huge gap between the demand and availability of port capacity, the central government has issued various guidelines for private investment in ports. Of these, the guidelines issued in October 1996 were the most comprehensive, facilitating private sector participation in the construction and operation of additional assets such as container terminals and cargo berths, construction of warehousing, dry docking, and ship repair facilities in the major ports. This marked the beginning of a move towards 'landlord ports'.

The first private investment under the guidelines was the two-berth terminal at the JNPT (Jawaharlal Nehru Port Trust), the concession for which was given to an Australia-led consortium, P&O Ports, India. The decision to allow private investment in major ports to create facilities which would compete with similar facilities operated by the port trusts made it necessary to ensure that the tariff setting by the port trusts is objective and that there is a level playing field for different players. This led to the creation of an independent tariff-setting body. In 1997, the central government amended the MPTA, 1963 and the IPA, 1908, and created TAMP (Tariff Authority for Major Ports).

Tariff Authority for Major Ports

Functions

All the powers of the government for fixing tariff in major ports are now vested with TAMP. It has no jurisdiction over the minor/private ports. While TAMP is empowered to 'issue regulations' in the case of transaction of business, appointment of staff, etc., it has no authority to issue regulations on tariff. However, TAMP has issued guidelines in this regard in 1998. The extent to which the regulation is legally tenable is a moot question.

Autonomy

- Not a quasi-judicial body, TAMP has no power to summon data, records, or persons; prescribe a time frame for compliance of its orders/directions, and monitor the compliance of such orders/directions. It has no power to levy fines and charges for non-compliance or violation of its orders/directions.
- While TAMP may appoint officers and such other employees required for efficient discharge of duties, it still has to depend on the government for creating posts.
- It has to rely on the budgetary resources for its expenses. It has no powers to levy fees on major ports, private operators in major ports, and port users in these ports for financing its expenses.
- The orders of TAMP are not final; the government has retained the powers to order remissions from and even alter the rates approved by TAMP.
- Section 53 of the MPTA, 1963 empowers the port trusts to waive the demurrage. This is not subject to the scrutiny of TAMP.
- The government can supersede TAMP if it (1) is unable to perform or persistently defaults in the performance of duty (2) has exceeded or abused its powers, or (3) has failed to comply with the directions of the government. However, TAMP has to be given a reasonable opportunity before it can be superseded. It is interesting to note that such provisions do not exist in the case of legislation governing TRAI (Telecom Regulatory Authority of India), and the CERC (Central Electricity Regulatory Commission).
- The selection procedure of the chairperson/members of TAMP is not transparent. The criteria for such selection are laid out and the central government is the sole authority that selects the chairperson/members. Also, there is no time limit for filling up any existing vacancies in TAMP.
- The chairperson/members of TAMP have not been debarred from taking up any employment after the completion of their tenure in TAMP.

Accountability

- An independent regulator has enormous power in terms of its ability to decide the flow of large amounts of public money through its decision on tariff. Thus, its accountability is normally ensured through its transparency and openness in the decision-making process. There is no specific provision in the amended Act to say that 'the Authority shall ensure transparency while exercising its powers and discharging its functions'; this provision, however, exists in the Telecom Regulatory Authority of India Act, 1997 and the Electricity Regulatory Commissions Act, 1998. TAMP has attempted to introduce such transparency through a consultation process to promote participation of the greatest number of interested parties, port-level hearings of a case or proposal jointly with port trusts / private operators and users, and ensuring adherence to the principle of natural justice. These guidelines have been mentioned in its TBR (Transactions of Business Regulations), 1998. This procedure, together with Section 50 C of the PLA (Port Laws [Amendment] Act), 1997 which states that 'every notification, declaration, order and regulation of the Authority – a copy thereof shall be kept in the office of the conservator and the custom house – and shall be open for reasonable times to the inspection of any person without any payment of fees', appears adequate to ensure transparency and accountability. However, the PLA, 1997 does not contain any provision for appeal to a higher court of law, implying an appeal with the government, which could lead to a conflict of interest.

- An external watchdog against TAMP's functioning is similar to that applicable to any government department.

Market structure

In addition to the major and minor ports, the market players in the ports sector include private captive berths within the ports and various service providers within major ports such as stevedores, shipping agents, etc. Private sector involvement has been proposed in various port activities including leasing out of existing assets of ports; creation of additional assets such as construction and operation of container terminals, cargo berths, carriage, and handling-equipment; leasing of equipment for cargo handling and floating crafts from the private sector; pilotage; and captive facilities for port-based industries. This step taken by the government has resulted in private sector participation in some major ports and state ports.

Market development: future trends

As indicated earlier, ports in India are overstretched. The Ninth Plan Working Group on Ports projected a capacity requirement of 420 MT by the year 2001, i.e., an increase of 172 MT over the current capacity. Further, the Ninth Plan proposes an additional capacity of 122 MT through public funding, leaving about 50 MT capacity to be added through productivity improvement, development of minor ports, and captive private ports. To meet this, it has been projected that more than 60 billion rupees must come in from private sources during the Ninth Plan. Thus, eventually there will be competition within and among ports. The artificial barriers between the major and minor ports, as it exists today, will have to be replaced in the event of competition, and state ports may have to compete with the major ports.

Constraints to competition

In India, competition between market players is not likely to be free, and would be constrained by the following.

- Restricted labour practices
- Absence of hinterland infrastructure facilities like rail and road
- Inadequate support facilities
- Dominant residual powers of the major port trusts

Issues

- How does one ensure free competition between major ports and other ports when major ports are fully regulated, whereas other ports are free to fix their own tariff?
- How does one ensure fair competition between a major port which pays no taxes and private port operators who have to pay taxes?
- Is there any role for an independent regulator to ensure free and fair competition?
- Should the regulator ensure the safety and conservancy aspects of port operations or should these be left to port companies / port trusts with the attendant danger of conflict between commercial interest and safety?
- How can consumer interests be protected? Who will set service standards?

Tariff setting

Ports usually derive revenue from cargo traffic and ship traffic. Revenue from cargo traffic includes (1) wharfage/ landing fees, cargo-related charges, (2) crane hire charges, (3) rentals from warehouses, (4) demurrage charges, and (5) charges for providing rail and other transport for cargo movement and providing water facilities to visit ships, etc. Revenue from ship traffic deals with (1) port dues, (2) pilotage, (3) berth hire, (4) survey and measuring fees, and (5) ship repairs in dock areas. Major ports have had operating surplus for the last few years. These are very high and, therefore, not sustainable; ports do not provide for depreciation and user costs of the capital. Their financial costs are minimal due to the absence of borrowed funds and port authorities are not required to pay any dividends and taxes. Further, substantial amounts of revenue earned by the ports are also, on account of income from demurrage on cargo, stored for a long time at the port premises.

Till 1997, the port charges and dues for various services used to be fixed under section 52 of the MPTA, 1963 by the port management with the approval of the central government. Port dues and pilotage fees are levied under the Indian Ports Act, 1908. The rates are prescribed in the 'scale of rates' published by the respective ports. This section has been deleted under the PLA, 1997. The latter amendment created TAMP.

Tariff structure prior to 1997

The tariff structure of ports was varied and complicated. The scale of rates was ad hoc and, in many cases, not based on rational principles. The nomenclature for various services differed from port to port. Periodic revisions of rates were done on an ad hoc basis to balance the operating revenue and expenditure, and this compounded many difficulties. The absence of updated revisions of rates (after incorporating all revisions made periodically) resulted in difficulties in making an easy reference to the tariff structure for the purpose of working out dues.

Tariff setting since 1997

In its Chennai (Tamil Nadu) Workshop (1998), TAMP deliberated on the tariff issue and indicated a set of guidelines for tariff regulation in major ports. These, inter alia, include the following.

- Port pricing will be based presently on cost-plus basis, with an assured RoR (rate of return).
- Notification of uniform rates for different ports will be avoided.
- Application of a differential tariff structure, using the marginal cost principle, in the case of captive facilities, mono commodity berths, and bulk cargo facilities.
- Tariff charge will be used for improving the efficiency of port operations.
- Tariff proposals will be initiated by the port trusts, or by private operators, bulk operators, representative bodies of different user groups, directly or through port trusts, or suo moto by TAMP.
- Consultation with other ports while determining the tariff will be adopted.
- There will be speaking orders by TAMP during tariff fixation.
- Tariff revision will be applicable for every two years.

Overview of tariff fixation

Since its inception, TAMP has issued tariff-related orders in more than 50 cases. Section 19 of the TBR, 1998 states that TAMP may delegate all or any of its powers in respect of processing a case or a proposal to the chairman and/or a member or to two members. At present, TAMP consists of two part-time members. The chairman, under the delegated power under Section 19(1) of the TBR, 1998, processes various cases and proposals. Often, approvals of TAMP for some cases or proposals were taken through circulation (under Section 11, TBR, 1998). From the perusal of a few orders of TAMP, the following has been found.

- An RoR of 18% of the cost is being allowed, while adopting the cost-plus approach for tariff fixation (with 12% as profit, 3% as replacement costs, and 3% as upgradation and modernization requirements).
- Within a price cap, variation of charges is allowed in the case of private operators. This is not permitted in the case of major ports.
- Tariff notification is for specific services only and not for the entire package of services. Thus, there are numerous notifications within a same port.
- In certain ports, efficiency parameters have been introduced while fixing the charges.
- The scale of rates are being revised every two years. On valid grounds, it can be revised prior to that period.
- In a lease tariff case, TAMP has fixed the tariff for berth for lease without prior approval of the lease case by the government (lease case of M/s Oswal Chemicals and Fertilizers Ltd at the Paradip Port in 1999).

Difficulties in application of the present approach

- Under the 'cost-plus approach', the RoR is allowed on a rate base. It is, however, not clear as to how the rate base can be established when the accounting practices are not uniform and when there are no laid-down procedures.
- Ports provide a variety of services, and these are availed of by the port users separately or as a whole depending on their operations. The calculation of the cost of each service, if it is made under the cost-plus approach, could be a formidable task and could lead to a plethora of rates to be fixed.
- By covering the cost in providing a return, how does TAMP guard the inefficiencies that creep in, and ensure that consumer interests are protected?

Future issues

Against the above, the need for the 'performance-based approach', which links cost-based tariff with port productivity, and the application of the marginal cost principle needs to be considered. While in some tariff orders of TAMP, reward has been given for the performance, it is yet to develop a well-considered approach that will lead to improvement in performance. Also, while TAMP in its discussion paper (1998) recognized that the marginal cost be applied in port operations, it is yet to develop a well thought out concept and procedure to address issues related to marginal cost pricing.

Regulatory reforms: present and future strategies

From the above discussion, it would appear that TAMP is essentially a body for regulating tariff, a power so far exercised by the government, and it is not a regulator like TRAI or the CERC.

- As it has no power over other ports, TAMP is not in a position to create a level playing field between major ports or other ports.
- Although TAMP has been given the power to adjudicate upon the proposals placed before it, it has not been given express authority to improve efficiency in ports, quality of service, and protect consumer interest (in respect of all of which powers have been given to TRAI or the CERC). It is not clear how TAMP can address these issues.

To sum up, the following issues need to be addressed.

- Can TAMP be an appropriate mechanism to improve the quality of port services and ensure cost efficiency? If not, should the role be expanded or another regulator be set up to regulate all port activities including tariff setting?
- Should there be separate regulators for minor ports on the lines of state electricity regulatory commissions in the states?

Senior advocate, Mumbai

S Venkiteswaran

Regulation in the transition to a liberalized economy

Transition to a liberalized environment: experiences and issues in regulation 263-264

Existing scenario

In the regime of the Major Port Trusts Act, 1963, the Indian Ports Act, 1908, and various States Maritime Acts or Ports Acts, the ownership, control, and management of both major and minor ports are vested in the central or concerned state governments. As such, ports operated strictly in accordance with the delegated legislation under which they were created. The trustees of a port or maritime board, as the case may be, became an extended arm of the government, subject to functioning within the framework of the Act. Regulatory provisions were few and far between since it was meaningless for the government to regulate itself. The few regulations that were in place were invariably not complied with. There was no authority to prosecute, since the wrongdoer was himself the prosecutor. However, in the overall picture, the management of the ports was answerable to the government, which in turn was answerable to the Parliament. These were, more or less, the effective checks and balances.

Liberalized environment

In the liberalized environment, the ownership, control, and management may vest in the private sector, the essential objective of which would be profit. Therefore, regulatory provisions are absolutely necessary. Regulation should be able to achieve its objectives without being counterproductive, obstructive, or cumbersome. The objective of the regulation should be to ensure effective conservancy, safety of the port and surrounding environment, implementation of international conventions, and prevention and control of pollution. Every port acts as a gateway to the country's imports and exports and hence the economy. Port activities have a direct relationship with industrial and other activities in and around that region, not only at the time of building of the port but also as requirements increase. To achieve one of the social objectives, it is necessary for the government to have a say in the long-term planning and design of ports, the expansions thereof, and the need for installation of certain types of cargo-handling equipment. The other social objective would be to keep a control on the tariff to prevent undue profiteering or monopoly.

A committee constituted by the Government of India under the chairmanship of Mr Babu Rajeev, Chairman of the Cochin Port Trust, addressed these social objectives.

Social objectives The committee was of the view that the proposed legislation for liberalization of ports should authorize the central or state government, as the case may be, to entrust the ownership, control, and management of an existing or new port on any company (private sector), subject to such terms and conditions as may be imposed by the government in accordance with the regulations. The regulations could take care of the contemporary needs from time to time, without the need for the Act to be amended.

Tariff With regard to tariff, the committee felt that it would not be correct in the liberalized regime for a third party to fix the schedule of rates and statement of conditions on which a port will render services. It is, therefore, suggested that the right to levy, impose, recover, and formulate the rates and statement of conditions on which services would be provided should be left to the freedom of the individual ports, provided that it be made mandatory for such ports to publish the scale of rates and statement of conditions at least three months before its coming into force. The legislation should constitute a 'rates tribunal' which should be open to any port user. The user could then contest the proposed imposition or change, as the case may be, in the scale of rates and statement of conditions published by a port before a tribunal on the ground that any or all of the rates and statement of conditions are disproportionate to the nature and quantum of services rendered, discriminatory, and/or oppressive in any manner. There should also be a provision entitling the tribunal to stay the implementation. There must be an obligation on the port to levy a scale of rates and statement of conditions, as approved by the tribunal from the dates fixed by the tribunal. The tribunal should consist of people who have commercial experience in the field.

The successful and organized functioning of a port being a matter of utmost national importance, it is necessary for ports to maintain financial discipline to continue to be viable and successful and expand their activities according to the need of the hour.

Australian Competition and Consumer Commission, Dickson ACT, Australia

Allan Asher

Australian port authority reform

Transition to a liberalized environment: experiences and issues in regulation 265-276

Role of ports and their strategic importance

Port authorities have a key role in affecting the efficiency of the port interface. Their direct charges and policies affect other port service providers, and thus the cost and reliability of sea transportation. This, in turn, affects trade performance and international competitiveness.

The core functions of port authorities include provision of berths, navigation aids on approaches to ports, channels, and other infrastructure such as breakwaters in ports. Port authorities limited to these roles are said to have adopted the 'landlord' model.

Port authorities may also provide non-core services which could be provided by private operators as well. These include pilotage, line handling, recreational boating facilities, port emergency services, cargo storage, and common user facilities.[1]

Services provided and charges levied by port authorities vary across ports. Common charges include berth hire; conservancy, for the provision of navigation aids; tonnage, a charge for channel use; and wharfage, a charge on cargo crossing a port. Stevedoring and customs brokers' fees are other significant costs in the port interface.

The activities and policies of the port authority, such as leasing of waterfront land and regulation of port service providers, may indirectly affect the costs and reliability of sea transportation, thus influencing port development and competitiveness. Thus, the importance of port authorities extends beyond what their revenues and employment levels might suggest.

Leasing policies may be used to affect other port service providers such as stevedores, pilots, mooring, and towage operators. Aspects of leasing which impact on other service providers, their services, and charges are terms of leases, criteria for awarding leases, and incentives provided for efficiency.

---

[1] For details of the services and activities of port authorities, see Port Authority Services and Activities, Industry Commission, Report 31, May 1993, pp. 17–19.

Port authority regulation may cover port services such as harbour towage, pilotage, and mooring services. Licensing can specify standards of service quality such as ordering lead times for towage and pilotage services. To improve the customer focus of services, criteria for awarding leases and licences can be set in consultation with the representatives of users, including ship operators and shippers. Non-exclusive licensing can be used to attract new entrants in services which are not natural monopolies to encourage competition in the provision of port services.

Market power of port authorities

Port authorities hold substantial market power as they generally face little or no competition from other ports for cargo throughput. Shippers have little choice regarding which port to use due to the long distances between ports in Australia; the absence of land transport infrastructure, such as railway lines, which would provide options for shippers to conveniently use any one of the several ports; and pan-Australian freight rates for liner cargoes. In the absence of competition between ports, port authorities may be in a position to charge more and provide poorer service.

Inter-port competition may exist for some cargoes, e.g., in the three northern ports of Tasmania, which are relatively close to each other, or Sydney–Brisbane for container cargo originating from northern New South Wales, southern Queensland, and Melbourne–Adelaide. Over time, the potential for inter-port competition may increase through improved land transport infrastructure. The Brisbane Ports Corporation in its 1996 Annual Report claimed a pricing model it had developed 'demonstrates that cost advantages can often be achieved through landbridging cargoes from interstate and shipping them through the Port of Brisbane'.

Intrastate competition may emerge as structural separation occurs. For example, the ports of Geelong and Portland in Victoria have been privatized. This could lead to competition for commodities such as grains from regions where each port can be accessed by rail lines.

Background to the reform process

The call for reform of the waterfront, including port authorities, was voiced in the late 1980s. A number of organizations including the Inter State Commission, Bureau of Transport and Communications Economics, Industry Commission, and users of port and shipping services advocated reform.

Port authorities have been criticized for the structure and level of charges, absence of competition, and regulatory barriers to entry. Specific criticisms are listed below.

- High level of charges.
- Port charges not reflective of the costs of providing particular services.
- The structure of charges leading to revenues from commercial users being applied for non-commercial purposes.
- The structure of charges relying too much on cargo-based charges (i.e., wharfage).
- Some charges, such as wharfage which is a charge on cargo crossing from ship to wharf, being used as a form of de facto taxation.
- Wharfage has even been charged on cargo crossing privately-owned berths.
- Different charging structures across ports making inter-port comparisons difficult.
- Port leasing policies not pro-competitive.
- Separation of port authorities from state government departments.

Port reform aims to increase the attractiveness of trade and trade throughput, improve timeliness and reliability of transport, promote competition where possible, and lower sea transportation costs through direct port costs and improving the reliability and speed of port interface.

Reforms recommended

A range of reforms covering the functions of the port authorities, financial accountability, pricing, leasing policies, labour practices, ownership structures, and independence from the government have been recommended. It has been suggested that port authorities become more autonomous. Port authorities should meet targets for financial performance and service provision, prepare corporate plans, and develop performance indicators. Pricing guidelines should be developed consistent with the 'user pays' principle. The problem in pricing is that there are large investments with sunk costs and marginal costs are below average costs. Competition should be promoted by encouraging short-term leases and improved leasing policies. Recommendations also included the establishment of integrated labour forces, particularly in smaller ports.

Approaches to reform

Port authorities have been implementing a range of reforms since the early 1990s. Reforms are considered under ownership structures, pricing, labour practices, competitive neutrality, and promotion of competition.

Approaches to reform include corporatization and privatization. Corporatization occurs with a direction to operate on a commercial basis while remaining in public ownership.

Corporatization is popular in New South Wales, Queensland, and South Australia. In Victoria, three outports have been or will be privatized after first being corporatized. Prior to privatization, natural monopoly areas, such as channels, were transferred to a new authority and remained in public ownership. Charges are being regulated under a price capping regime.

Landlord models have been implemented with the contracting out and sale of non-core functions such as pilot and navigation services. Separation has occurred with non-core assets sold off and functions contracted out. Examples include maintenance functions and the pilot service in Sydney, and the sale of bulk grain handling facilities in South Australia. There has been a call for expression of interest in the Melbourne Port Services, a subsidiary of the Melbourne Ports Corporation, which provides mooring, dredging, and security services.

Contracting out has been introduced in ports which have eliminated non-core functions. Ports authorities are involved in a range of other non-core activities including provision of recreational facilities, cargo handling, pilotage, and terminal operation and stevedoring.

Competitive neutrality principles have been implemented in some cases. These include requirements to pay loan guarantee fees and an income tax equivalent. The CSOs (community service obligations) have also been identified and separately funded.

In implementing competitive neutrality principles, income tax equivalents and loan guarantees have been introduced in several states including Tasmania, Queensland, and South Australia. The CSOs have been identified, costed, and directly funded from state budgets. The CSOs include maintenance of recreational boating facilities and beaches and non-commercial ports.

Regulatory and commercial functions have also been separated. Regulations covering safety and the environment have been transferred to other authorities.

Pricing reforms have attempted to move pricing structures toward a 'user pays' approach and to lower the level of charges. The latter has been financed through debt reduction and elimination of non-core functions. Lower charges aim to attract more cargo through a port. Pricing reforms have occurred through a move away from cargo-based charges, such as wharfage, and overall reductions in the level of charges in order to reduce the costs of transporting goods through a port.

Rate-of-return targets and dividend requirements have been specified. Financial reforms include the implementation of rate-of-return targets, dividend requirements, and payment of income tax equivalents.

There have been significant reductions in port authority employment. Labour reforms include establishment of integrated labour forces where port authority employees also perform other functions including stevedoring and towage in other ports. This reform is most appropriate to outports where the frequency of ship visits is not high and labour may be otherwise idle.

Outline of reforms in individual states

New South Wales

Reform in New South Wales commenced with the separation of the MSB (Maritime Service Board) and the acceptance of the landlord model. Until 1989, the MSB was responsible for functions of the port authority in the state ports of Newcastle, Sydney/Port Botany, and Port Kembla. In 1989, the MSB was separated into four subsidiaries. One subsidiary, the MSB Waterways Authority, is responsible for recreational boating and some non-commercial ports.

Non-core activities and assets were divested. These include coal loading, stevedoring, wharf maintenance, installation of navigation buoys, ship repair, capital construction, pilotage, and victualling. An income tax equivalent is required to be paid. The CSOs have been recognized since 1992/93. The New South Wales government is currently pursing a policy of corporatization of the former MSB. Charges in the Port of Sydney have decreased from $77.97/teu[2] (20-foot equivalent unit, or one standard container) in 1993 to $69.73/teu in 1996. Reductions in the navigation service charge and in wharfage were implemented in 1995.

Victoria

The Victorian government privatized two ports, Portland and Geelong, in 1996. These ports are subject to regulation under the Victorian Office of the Regulator-General. Price regulation consists of five-year price caps where 'x' is set at five per cent per annum.

The Port of Melbourne Authority has been separated into three entities, the MPC (Melbourne Ports Corporation), the VCA (Victorian Channels Authority), and the MPS (Melbourne Ports Services). The MPC and the VCA are to remain in public ownership, while the latter is in the process of being privatized. Tenders for the management of the Port of Westernport are currently being assessed.

---

[2] Dollars in this paper refer to Australian dollars.

Role for the Australian Competition and Consumer Commission

The role of the ACCC (Australian Competition & Consumer Commission) includes the fostering of competition, particularly in those areas of the economy where it is less than effective. Where competition is likely to remain weak it may also have a role in restraining price increases. With the enactment of the Competition Policy Reform Act and supporting legislation in the states, the Trade Practices Act and the Prices Surveillance Act now extend to port authorities. The ACCC also considers that it has a role to monitor and comment on reforms occurring in the ports sector. This would cover, for example, the pace of reform, how well it is achieving its objectives, whether it is appropriate to the particular port circumstances and to the users of the port, and whether reforms implemented are in line with the National Competition Policy.

The ACCC may provide input into leasing and licensing policies of port authorities to ensure competition is developed where possible and performance is improved. The ACCC is also concerned that entry is not prevented through regulatory barriers, such as exclusive licences and long-term leases.

Annex 1

Port authority reforms (1990-96)

Table 1 New South Wales

Year	Event
1989/90	Separation of the MSB (Maritime Service Board) into three subsidiaries to cover the ports of Newcastle, Sydney/Port Botany, and Port Kembla. A waterways authority was established, which is responsible for reform of pricing towards the 'user pays' principles and elimination of cross-subsidies. Divestiture to the private sector of Newcastle coal and other bulk-loading facilities.
1990/91	Adoption of the landlord model leading to separation of commercial, non-commercial, and regulatory functions and divestiture of non-core assets and responsibilities. Lease of Port Kembla coal loader to the private sector (which reportedly decreased charges by 22% over the following year).
1991/92	Closure of the Balmain coal loader; transfer of regulatory functions to the Department of Transport; and withdrawal from pilotage service.
1993/94	Closure of the Sydney maintenance workshop and increase in contracting out; and waterfront construction and navigation aids businesses contracted out.
1994/95	Dissolution of the MSB and replacement with corporations covering the ports of Newcastle, Sydney/Port Botany, and Port Kembla.
February 1995	Reduction in wharfage charges between 15% and 29%.
July 1996	Reductions of 11% in navigation charges and 60% in empty container rates.
November 1996	The SPC (Sydney Ports Corporation) concludes lease agreement with Patrick Stevedores. The lease term was extended from 2008 to 2018. Incentives for productivity improvements and operational standards comparable to similar international container facilities were included in the agreement. Patrick Stevedores announced investment plans of 100 million dollars to progressively increase the capacity for container throughput from 330 000 teu per annum to 550 000 by 1998 and 800 000 by 2003.
July 1997	Port Kembla Port Corporation abandons its price schedule to be replaced by negotiated arrangements according to the DCN (Daily Commercial News) in a move to attract new cargoes to the port.
July 1997	There could be a second-line handling services provider in Sydney with the entry of Melbourne Mooring Services. Currently, line services are provided by Stannard Brothers, which is a monopoly provider in the port, and the SPC has expressed concern at the cost of the service.
July 1997	With the OOCL (Overseas Orient Container Line) not proceeding with a container terminal in Melbourne, there have been discussions between the OOCL and the SPC on a container terminal in Sydney.

Table 2 Victoria

Year	Event
1991/92	Strang Patrick Stevedoring awarded rights to develop East Swanson Dock as a multi-modal facility.
1992	The State Owned Enterprises Act passed, which focuses on commercial objectives, dividend payments as a return on equity, and income tax equivalents to be paid.
1993	Port tenants able to contract with a service provider of their choice for maintenance services rather than the PMA (Port of Melbourne Authority). This is consistent with the government's policy of contracting out. The Port of Geelong Authority divests community and recreational facilities.
December 1994	Abolition of tonnage duty and reduction of 15% in wharfage at the Port of Melbourne on all cargoes.
January 1995	Release of government's port reform policy including a commitment to provide 33% reduction in port charges (over a time period which is not specified). Other aims included increased efficiency. Key reforms were creation of the VCA (Victorian Channels Authority) and the MPC (Melbourne Ports Corporation), divestment of non-core assets and functions, and transfer of PMA regulatory functions to other bodies.
1995	Identification of the CSOs (community service obligations) and separate funding from state budget.
1996	Establishment of the VCA with responsibility for channels and navigation at all Victorian ports. Establishment of the MPC with a landlord role to replace the PMA. Privatization of the ports of Portland and Geelong. Regulation of charges by the Office of the Regulator-General under a price cap for five years, with charges to fall in real terms by 20% over that time. The Port of Westernport to be privatized.
1 July 1996	Reduction in wharfage of 20% at the Port of Melbourne.
September 1996	Melbourne Mooring Services commences operations in the Port of Melbourne. The incumbent MPS (Melbourne Port Services), which was part of the PMA, is sold to Skilled Engineering at the end of May.
22 November 1996	The EBAs (enterprise bargaining agreements) negotiated for the ports of Geelong and Portland. According to the MUA (Maritime Union of Australia), these allowed for increased flexibility although details were not provided in the DCN.
November 1996	Call for expressions of interest in the MPS.
July 1997	Channel usage charges for Melbourne and Geelong decrease by 11% under an order from the ORG. The VCA is subject to a price cap of CPI (consumer price index), 12%. Revenue derived provides shipping control, maintenance dredging, hydrographic surveys, and navigation aids. Channel charges are levied on a per tonne basis. Wharfage charges, berth hire, and area hire are to be reduced by 8.5%. These charges are subject to a price cap of CPI 10%. The LSS (Liner Shipping Services) commented, however, that it was disappointed with the extent of decrease. The reduction in berth hire charges was to apply only to common user berths and not leased terminal berths.
July 1997	The OOCL pulls out of its proposal to establish a container terminal in Melbourne leaving the option that it may consider for a terminal.

Table 3 South Australia

Year	Event
1990	Restructuring of the Department of Marine and Harbours, which included divestiture of dredging and workshop services with contracting out introduced.
1993	Reform of pricing policy.
1994	Formation of the South Australian Ports Corporation on 24 October (which manages Port Adelaide and nine regional ports). A requirement to earn a commercial rate of return on assets. The CSOs identified and separately funded including marine safety functions.
1 January 1995	Reductions in wharfage charges of 10% and 13% on general purpose containers and refrigerated containers, respectively.
1995	Commencement of payments of income tax equivalents and dividends on profits.
1996	Sale of bulk grain loading facilities at regional ports.

Table 4 Western Australia

Year	Event
1990	The state government announces intention to corporatize GTEs (government trading enterprises), including port authorities.
1992	Integrated labour forces introduced in the ports of Albany, Bunbury, Esperance, Geraldton, Broome, and Wyndam.
1994	The FPA (Fremantle Port Authority) closes stevedoring maintenance service. Pricing reform towards user pays principle.
July 1995	Reduction in port charges by an average of 9.5%.
1996	Commercialization of the FPA whereby management will have increased autonomy and acceptability. Specific changes include removal of three per cent statutory levy on turnover with no increases in port charges for 1996/97. The CSOs to be funded by the government.
1 July 1996	Introduction of regime for the FPA.
July 1997	The FPA announces lower charges for wharfage, berth hire, pilotage, and hazardous cargo charges from 1 July. Factors underlying the decrease were increased trade through the port, improved efficiency, and commercialization of the port. The FPA claims charges have decreased by 27% in real terms over four years.

Table 5 Tasmania

Year	Event
1990	The State Authorities Financial Management Act enacted with provisions requiring payment of adequate returns.
1993	Introduction of competitive neutrality principles. Requirements for port authorities to pay income tax equivalents and guarantee fees. The CSOs separately funded.
November 1996	Four ports, Hobart, Launceston, Devonport, and Burnie, to be corporatized. The port authorities to be incorporated and owned by the state government. Non-commercial functions such as regulation and community services to be provided through a new statutory authority.

Table 6 Queensland

Year	Event
1990	Review of Queensland's ports recommends port authorities be corporatized.
1992	Queensland government releases paper on guidelines for corporatization. Included provisions for loan guarantee fees and application of all taxes and charges.
June 1994	Certification of the EBA for the Port of Brisbane including an increase in base working hours from 36.25 to 38 hours per week.
July 1994	The Brisbane Port Authority and the Gladstone Port Authority corporatized. The board is required to submit an annual plan to the Minister of Transport and Treasurer. Berthage charges on cargo-carrying vessels abolished to help encourage more shipping to use the port. Other reforms include direct funding of the CSOs, requirement to earn a commercial rate of return on assets.
July 1995	Implementation of a taxation equivalents regime whereby an amount paid on profits based is on Commonwealth taxation.
1995	Review of pricing policy flagged in the Annual Report.
1996	New stevedore, Keon, enters the port.
January 1997	Reduction in docking and conservancy fees for ships using Queensland ports.

Port authority leasing policies: recommendations

The TPC (Trade Practices Commission) in 1992 listed recommendations for port authority leasing policies in its report *Port Leasing Policies: A way to competition and efficiency on the waterfront* (December 1992). These included competitive tendering, short-term leases, and valuation of port assets at opportunity cost.

Principles of the National Competition Policy

Principles of the policy recommend separation of regulatory and commercial functions; that government enterprises operate on an equal basis with the private sector, i.e., there be competitive neutrality; extension of the coverage of Part IV of the Trade Practices Act, 1974, to include state government authorities; and regulation of monopoly pricing.

Industry Commission Model (from 1993 report)

The IC (Industry Commission) supported the landlord role for port authorities providing core functions only and not services which could be undertaken by the private sector, the only exceptions being smaller outports. Privatization was also considered and recommended as an option.

A corporate environment was recommended for port authorities as there would be autonomy from government and stronger efficiency incentives. Other key recommendations were that (1) they should be separate bodies from the departmental structure of government, (2) they should not regulate functions in which they are also engaged, (3) they should be liable for taxes and government charges, and (4) regulatory and leasing role of port authorities be separated from port authorities where they themselves are engaged in the function(s).

Other measures to promote reform

- Declaration under the PSA (Prices Surveillance Act), 1983 for either surveillance or formal monitoring
- Integration of port labour forces
- Identification of non-core functions of port authorities and opening to private sector competition
- Establishment of performance benchmarks to facilitate yardstick competition
- Landbridging and breakdown of pan-Australian freight rates to promote inter-port competition
- Privatization in some cases
- Introduction of common terminology for charges as recommended by the IC, but which has not yet been implemented

Price monitoring and surveillance

- Port authority charges are as significant a cost to ship operators as other port services (e.g., pilotage, towage, and stevedoring).
- It may be argued that port authorities have market power, assuming markets are defined as regional.
- The PSA now extends to cover state government authorities which are not subject to a state pricing authority.
- The IC in its 1993 report recommended that the ACCC should have oversight of charges.
- *Pricing issues including the pricing of underutilized port assets* – To what extent should a commercial rate of return be earned on such assets or should port authority owners earn a lower return? If labour and capital productivity in ports improves, leading to lower ship turnaround times while berth hire is based on time at a berth, who should absorb a revenue shortfall? Do present pricing structures based on time discourage efficiency improvements?
- Monitoring port authorities would complement other monitoring in the maritime sector such as coastal shipping freight rates, towage charges, and stevedoring.
- In recent years, port authorities have been subject to commercialization, corporatization, privatization (in the case of three Victorian regional ports), and shedding of non-core functions. These policies aim to improve efficiency. However, there is a need for an assessment of whether benefits arising are passed to users. There is a concern that benefits could pass to state governments.

Port authority monitoring

- There would be a need, however, for coordination with other agencies doing waterfront monitoring work.
- Waterfront monitoring has been done to date by other agencies.
- Reductions in navigation service charges and in wharfage were implemented in 1995.

Gujarat Pipavav Port Ltd, Mumbai

Nikhil Gandhi

Transition to liberalized integrated infrastructure development

Transition to a liberalized environment: experiences and issues in regulation 277-280

Issues in transition

What are the key issues of transition which have an impact on the market structure pertaining to ports, especially minor ports and private operators? Both the central and state governments through the MoST (Ministry of Surface Transport) and state maritime boards have been endeavouring to overcome the problems which have plagued infrastructure development in India. However, having already made the transition to being proactive than reactive, the pace of implementation of integrated infrastructure imperatives needs to be speeded up considerably. The valuable suggestions made by Dr Rakesh Mohan in the India Infrastructure Report and the recent ones made by the Task Force on Infrastructure, under the chairmanship of Mr Ratan Tata, set up by the Honourable Prime Minister need to be implemented in a time-bound programme to ensure that the huge demand and supply gap in the ever-increasing seaborne trade volumes of our country vis-à-vis non-commensurate port facilities available is narrowed down by the beginning of the new millennium.

The need of the hour is transition from isolated infrastructure development to integrated infrastructure development of major and minor ports in India. This should be done by public, private, and joint sectors, as well as strategic alliance with foreign ports such as Singapore, and by closer coordination between state and central governments. This transition can be specifically divided into two broad categories.

Integrated port development

A strategic master development plan for the entire Indian port sector covering major and minor, private, and captive ports with a time-bound implementation target should be developed, based on pick-up in cargo volumes/potentiality, changes in shipping technology, bulk, break-bulk and container-handling operations and related equipment, hub/transhipment ports, coastal shipping, and inland transport links. Having crystallized this, the existing and prevailing conditions at these ports have to be analysed. Step-wise implementation should be indicated towards augmenting existing port facilities by way of removal of constraints like redundant labour laws, modernization, replacement of existing equipment, and creation of new ports at greenfield sites. This, in turn, should lead to specific transition steps such as

- buy-out of redundant labour and changes in existing port labour laws
- more budgetary allocation by the government for meeting the huge funding needs for upgradation of existing equipment and development of new ports
- changes in investment policies and higher fiscal incentives to facilitate and rope in private sector investments.

However, when considering such integrated port development, commercial factors must be integrated with social and economic benefits. The strategic plan should also consider the market position, market role, and expectations – not forecasts but targets which reflect the nations' and ports' objectives. Considering the market structure and the market demand for port expansion and enhanced facilities, and relating it to the huge investments needed to provide the same, the beneficiaries, namely the exporters/importers (public/private), transporters, warehousing and container corporations/private parties, etc., can also share the cost by way of investment in the development of the port sector, apart from the enhanced government budgetary allocation and private sector investments. Integration of all beneficiaries would ensure a better market structure for infrastructure development. A suitable mechanism can be evolved to ensure that these public–public, public–private, private–private partnerships get driven by market forces and accrue benefits. The existing restrictions on investments by government corporations in infrastructure development act as deterrents.

Supportive infrastructure development

The second aspect pertains to providing proper collateral/ supportive infrastructure to ports. The mandatory collateral infrastructure for a seaport comprises mainly rail and road links to ensure the speedy movement of cargo to and from the port. The port development authority should primarily concentrate on the development, operations, and management of the port, whereas the government (central or state) has to ensure adequate connectivity of the port with its hinterland. Unfortunately, in India, such supportive infrastructure is not readily available. The purpose behind the enhancement of existing port facilities or development of new ports would be defeated unless and until simultaneous and commensurate supportive infrastructure development takes place. Herein lies the need for transition to an integrated infrastructure development plan for the nation as a whole, as well as the maritime states, some of which (like Gujarat) have taken steps in this direction. The lack of supportive infrastructure leads to lack of response by private sector investors as has happened in the Jaigad port development project in Maharashtra, where the distance of 43 km from the national highway and 50 km from the Konkan railway acted as a major deterrent. As a part of the national plan for strategic integrated infrastructure development, not only the major ports but also the minor ports should be connected to the national highway rather than the state highway as prioritization, implementation, and availability of funds would be relatively greater.

Safety and conservancy aspects

Safety and conservancy aspects are interlinked with the protection of the environment, especially in the operational aspects of a multi-purpose port such as the port of Pipavav which handles bulk, break-bulk, containers, as also liquid, liquefied petroleum gas, petroleum, oil, and lubricants, and chemical cargo. Operational safety and proper conservancy at the port of Pipavav or any other port depends on various factors including

- proper awareness and skill of port personnel and their deployment based on requisite expertise and experience
- quality of facilities which inter alia comprises proper navigational/piloting and transit tower aids for safe port access
- proper administrative and organizational structures, and structuring of the operational laid-down processes, systems, and procedures
- availability of resources and willingness of the management to use these for improving the safety standards and protecting the environment.

Port facilities should be set up subsequent to proper risk and environmental impact assessments. These safety aspects over constructional hygiene which includes planning and construction of the port with safety and environment in mind, e.g., safe roads and stackyards / warehouse buildings for storage of dangerous goods, fire detection, alarm and fighting systems, sufficient lighting, adequate communication systems, etc. It also involves operational discipline related to all long- and medium-term and day-to-day planning and execution of the normal operations in a port. Since these areas require substantial expertise and experience, prior to inducting or developing in-house expertise, these functions could be contracted out to the right private personnel who in turn would train and imbibe the personnel for future in-house absorption.

Scope for port competition

Normally, no port in India can be considered to be in a monopolistic market position since direct or indirect competition driven by market demand and market forces exists. Each port has its immediate captive area which can be categorized as regional/immediate hinterland where inter-port competition would be negligible because of distinct locational advantages, relatively lesser distances and commensurately lesser transportation costs, and less lead time for movement of cargo to and from the particular port. However, the marginal area or extended hinterland of a particular port is where the inter-port competition in relation to port users or attracting shipping lines exists.

The port users would consider the port navigational facilities, vessel turnaround time, detention/demurrage charges, stackyard/warehousing facilities, vessel calls by shipping lines, connectivity by road and rail, tariff structure, productivity of labour, customs procedures, etc., as the prime factors because the bottom line of port users would be what makes the most commercial sense. The question to be answered by each port authority is how the particular port is seen from the customer's point of view. As a part of the management philosophy and strategy, inter-port competition should be accepted as a positive incentive to improve port services.

Having accepted the fact of inter-port competition, a particular port has to define the role it wants to play in the overall national port development plan which implies dovetailing it with the integrated infrastructure development plan. At the same time, the particular port management must define its market position and accordingly carry out requisite actions for influencing and channelling the flow of cargo through their port.

However, considering the cargo projections and potentiality and the relative huge demand and supply gap vis-à-vis port facilities available or on the anvil, there is enough traffic/cargo availability for existing operational ports as well as for proposed new ports or enhancement in existing port facilities. Inter-port competition should be one of the greatest motivating factors for ambitious management.

Challenges ahead

India has a long way to go and the task ahead is full of challenges and opportunities for both the public and private sectors to ensure a smooth, effective, and efficient transition to a liberalized environment.

Mumbai Port
Trust, Mumbai

R R Sinha

Ports: market structure

Transition to a liberalized environment: experiences and issues in regulation 281

Exhibit 1 *Issues which make commercialization and privatization imperative*

1 Technological development and expertise
2 Productivity and competitiveness
3 Dynamism and flexibility
4 Capital-intensive
5 Ineffective institutional structure
6 Market forces

Exhibit 2 *Different models*

1 Landlord ports
2 Comprehensive ports
3 Existing major ports
4 Minor ports

There is no dearth of experience around the world and it is better we learn from them and consciously make our choice

Exhibit 3 *Constraints*
(Not in order of importance)

1 Environment (coastal regulation zone regulations)
2 Labour
3 Freedom to fix tariff in major ports
4 Inability of Indian firms
5 Back-up policy and infrastructure
6 Existing set-up in major ports

Indian Ports Association, New Delhi

Amal Chakravorty

Indian ports: transition to a liberalized environment

Transition to a liberalized environment: experiences and issues in regulation 282-286

Introduction

India, surrounded by the Bay of Bengal, Indian Ocean, and the Arabian Sea, has a 6000-km-long coastline studded with 160-odd ports. Eleven are major ports and the remaining are commonly known as intermediate and minor ports. Major port refers to any port which the central government may by notification in the Official Gazette declare, or may under any law for the time being in force, have declared to be a major port. 'Other ports' means any port which the state government by notification in the Official Gazette declares to be a state-controlled port.

Legislation governing the functioning of the ports in India today primarily is the Indian Ports Act, 1908 covering all ports, and the Major Port Trusts Act, 1963 regulating the major ports.

A port is a 'local authority' legally entitled to or entrusted by the government with the control and management of local funds. Ports are entrusted with the performance of civil duties and functions, which would otherwise be governmental duties and functions. Ports have the power to raise funds for the furtherance of their activities by levying charges, fees, etc.

Only 17 of the state ports service ocean-going vessels. The administration, management, and development of state ports are the responsibilities of the maritime board in the states where it has been constituted under a statute. In other states, the port's directorate, functioning as a department of the government, oversees port activities.

The traffic handled by Indian ports (both major and minor) during the last five years is given in Table 1.

Table 1 Traffic handled by Indian ports from 1993 to 1998 (million tonnes)

Ports	1993/94	1994/95	1995/96	1996/97	1997/98
Major ports	179.26 (93)	197.26 (92)	215.34 (91)	227.13 (92)	251.51 (88)
Minor ports	14.23 (7)	18.41 (8)	20.30 (9)	24.93 (8)	35.34 (12)
Total	193.49	215.67	235.64	252.06	286.85

Note Figures in parentheses denote percentage levels.

Appraisal of capacity by port and by commodity vis-à-vis traffic handled at major ports in 1997/98 shows capacity constraints and that the ports are operating beyond or near-saturation points of their capacities, resulting in high-berthing detention and turnaround time of ships. Against an available aggregate capacity of 217.21 million tonnes, traffic handled at major ports in 1997/98 was 251.51 million tonnes.

Traffic projections made by the Ninth Plan Working Group envisage traffic of 424 million tonnes in 2002, the terminal year of the Ninth Five-Year Plan. On completion of the Eighth Plan, spill-over schemes now under execution, the capacity will go up to 252 million tonnes. Against the additional capacity needs of about 172 million tonnes by the terminal year of the Ninth Plan, an addition of 122 million tonnes capacity is envisaged at major ports at an estimated cost of 175 billion rupees (4.5 billion dollars). The shortfall is proposed to be met through the development of state ports and captive facilities by user industries, in addition to induction of private investment.

ure tegies

Adopting the strategies used by ports worldwide to address problems under similar circumstances, liberalization, modernization, commercialization, and privatization of ports have been thought of. It is an invitation to both Indian and foreign organizations to invest in various port developmental activities. Areas have been identified for private sector participation. Detailed guidelines in respect of procedures to be followed for inviting private investment have been announced.

A scheme of joint venture formations between major ports and foreign ports, between major ports and minor ports, without tenders, and between major ports and company(ies) through tenders has been approved by the cabinet. The government has since changed its fiscal policies to offer various incentives to the private investor in the development of port infrastructure.

Figure 1 graphically represents the spectrum of options under commercialization/privatization. Commercialization seeks to introduce strategies typical of the private sector into public

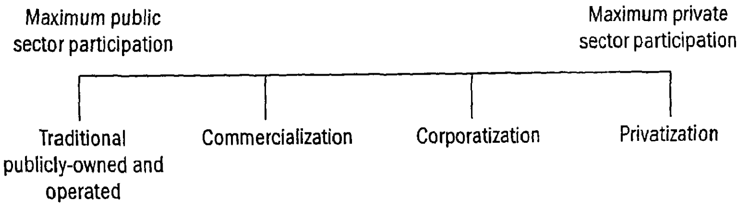

Maximum public sector participation
Maximum private sector participation
Traditional publicly-owned and operated
Commercialization
Corporatization
Privatization

Figure 1 Spectrum of commercialization/privatization options

port management. Commercialization is adopted as a transition towards greater private sector involvement. The next step 'corporatization' is the transformation of the port from its statutory role under port legislation to a fully commercialized but government-owned body, subject to the Companies Act, 1956. Such a move will boost the levels of independence from day-to-day bureaucratic intervention and of financial freedom. This will require separating public statutory functions from commercial activities, leaving only the latter with the newly created corporations. Equities of these companies are then sold to private operators/investors and the original port authority is transformed into the new landlord port authority, with regulatory power vested in it.

In a joint venture company, the governmental entity may invest by way of cash, assets, land, or right to use the foreshore as its share of equity. A private sector company may invest through financing and in upgrading facilities or buying new equipment, as well as the provision of technical and managerial expertise.

Leasing provides for full transfer of specified assets to a private operator for an agreed period of time. Longer agreements encourage the private party to make more significant investments and to take other steps to build up the business.

Privatization implies actual transfer to ownership of land, infrastructure, and/or equipment to the private sector to own in perpetuity.

Under the restrictive ambit of the Major Port Trusts Act, 1963, major ports are unable to operate in increasingly market-oriented situations and obtain flexibility of commercial operations. A structural reorganization of major port trusts is called for to provide the necessary independence of authority and decision-making, coagulate investment, execute projects, and manage operations with professional finesse. The required structural reorganization of major ports is sought to be achieved through their corporatization.

Not much complexity exists for state ports. The maritime board / state port department is responsible for the conservancy and administration of state ports in accordance with the Indian Ports Act, 1908 and other statutes and rules framed thereunder. Maritime states, especially Gujarat, Maharashtra, Andhra Pradesh, etc., are responding more and more to initiatives from prospective developers rather than preparing their own overall plan and encouraging activities at greenfield sites. The state governments envisage an integrated port development strategy, comprising the creation of port facilities, industrialization, and development of infrastructural facilities such as roads and railways linking ports to the hinterland. Suitable sites for development have been identified, techno-economic pre-feasibility studies carried out, and guidelines formulated for the development of multi-user facilities by private sector participation.

The state ports have the advantage over major ports in that the maritime boards / state port departments are responsible for both regulatory and developmental activities in the maritime field. Thus, private entrepreneurs have less hurdles to negotiate and enjoy the much-needed functional autonomy and operational flexibility. This is amply clear from the present scenario. Two private ports, Pipavav and Adani, are already operational in Gujarat; keen interest is being shown by multinational/private companies for the development of port facilities in Maroli, Dhamra, Colachal, Vadarevu, and Gangavaram, and in the captive facilities in Dabhol, Nandikur, etc. Public and private sector companies are developing or planning captive port facilities in Dahej, Hazira, Bedi, etc.

The future of port labour in the event of privatization of ports is one of the most contentious issues. Most major ports are overstaffed and infested with restrictive practices, which have grown over the years. Alternative employment opportunities are limited. The Voluntary Retirement or the Golden Handshake Scheme offered to the employees of major ports in 1992 met with little response. Most of those who availed of the opportunity were not the target persons, and the scum remained. Rationalization of labour practices and corresponding adaptation of the workforce through socially acceptable schemes are imperative for any significant private sector involvement.

An overriding aim of the private sector is to make an appropriate return on its investment. This is the driving force in a competitive environment and it encourages attainment of the highest levels of efficiency. The private sector looks out for opportunities where its skill and resources can best be employed to maximize returns within an environment of manageable risk. Government action to control tariffs or cap profits will, therefore, have a direct impact on the primary objective of the private sector and may make the project unattractive. A private company may not accept a long-term contract for the management and operation of a commercial undertaking without control of the pricing process. Another concern is the currency in which tariffs are denominated. A large amount of an operator's expenses may be payable abroad, e.g., capital and interest payment, purchase of equipment, etc., whereas local legislation may mandate tariff in domestic currency.

The Chinese government has released joint ventures from price control and given full freedom in setting terminal tariffs. The Port of Rotterdam assumes that competition within and between ports will keep tariffs in line with actual costs and the operators' profit motivation will serve to enhance efficiency and minimize costs. Law 62/97 grants freedom to each port authority in Spain to determine the level of port dues and tariff to be charged. In the UK, the Harbour Act, 1964 allows ports freedom to determine their own tariff, subject to test of reasonableness, which can be answered in courts.

Under the existing Port Acts, it is not conceptually possible to vest the control, ownership, and management of a major port on any public/private/joint venture company. To provide more autonomy to port authorities, be it a private, corporate, joint venture, or trust body, the age-old Indian Ports Act, 1908 and Major Port Trusts Act, 1963 need to be amended. This is under active consideration of the government. During the last decade or so, a large number of countries enacted new legislation for port privatization, instead of fine-tuning and amending the existing acts. It is high time that the Government of India follows suit and expedites the process of transition to a liberalized environment for Indian ports.

Office of the Regulator-General, Victoria, Melbourne, Australia

Sohail Hasnie

Application of revenue yield price control to Victorian ports

Transition to a liberalized environment: experiences and issues in regulation 287-304

Introduction

The Victorian government implemented a wide range of reform programmes between 1995 and 1997. Its key aim was the introduction of a competitive environment, which demanded structural and regulatory reform and finally privatization.

This paper describes the regulatory framework that was put in place as a surrogate for competition for services where natural monopoly existed and competition was not possible. It also describes how Victoria has adopted the average revenue yield type price control (widely used in electricity and telecommunications industries) to regulate the monopoly port services.

Victorian ports

In 1995, before deregulation, Victoria's commercial ports were administered by the PMA (Port of Melbourne Authority), the PGA (Port of Geelong Authority), and the PPA (Port of Portland Authority). The port authorities before deregulation have been described by the Victorian government's Privatization and Industry Reform Division.

Port of Melbourne Authority

The Port of Melbourne was Australia's largest container port, which also handled a wide range of general cargo. It had 48 berths for commercial shipping. Melbourne's container cargo (about 76% of the total trade) landed at either of the two privately operated container terminals at Swanston Dock or at Webb Dock which services coastal and overseas roll-on–roll-off vessels.

The Port of Hastings consisted of three commercial berths. Two of these were dedicated to BHP Steel and the Esso/BHP Petroleum joint ventures, respectively. Ninety per cent of the port's trade was bulk liquid. Private firms provided pilotage, towage, and stevedoring at PMA's ports.

Port of Geelong Authority

The PGA administered the Port of Geelong – a regional cargo port with 14 commercial berths in separate locations, along with a ship repair facility and slipway. Geelong's trade consisted of petroleum products, grain, fertilizers, steel, chemicals, smelter raw materials, timber products, and other bulk. Private firms provided pilotage, towage, stevedoring, wharf cleaning, lines, and security services.

Port of Portland Authority

The PPA administered the Port of Portland which was a regional general cargo port consisting of five common user berths and one dedicated berth for the Portland Aluminium Smelter. The port's main cargoes were grains, woodchips, aluminium products and raw materials, fertilizers, and livestock. A significant commercial fishing fleet also resided at the port. The authority provided towage and stevedoring services.

In 1995, these government-owned businesses still lacked commercial focus and performance standard, despite significant commercialization of port authorities in the proceeding years. The financial performance of the authorities was poor and levels of return to the government remained very low (Annex 1).

Reform in the ports

In 1995, the following reforms were undertaken.

- A new public sector landlord, the MPC (Melbourne Port Corporation), was established for the Port of Melbourne. The MPC is the statutory authority responsible for planning and coordinating the development of port land and infrastructure within that area and making that land and infrastructure available to port service providers.
- The Ports of Geelong, Portland, and Hastings have been sold to initial port operators who are responsible for the management and operations of these ports.
- A new statutory authority – VCA (Victorian Channels Authority) – was set up and is responsible for all channels in Port Phillip and Corio Bays, Portland and Westernport, and the Ports of Melbourne and Geelong. The responsibilities of the VCA are harbour control in Port Phillip and Corio Bays, the dredging and maintenance of channels, and provision of navigational aids to the PMA's customers.

Regulatory framework

The regulatory framework provided for the port services industry is essentially light handed. The Regulator-General describes the framework by way of legislation and other relevant documents as

- providing an unambiguous framework which maximizes the scope for commercially negotiated outcomes
- avoiding onerous restrictions or reporting requirements on market participants
- including effective reserve powers to protect customers and correct uncompetitive market behaviour.

That is, as far as reasonably practicable, the regulatory framework encourages industry participants and their customers to negotiate commercial outcomes with intervention by the Office of the Regulator-General (hereafter, the Office) only where it is necessary to correct misuse or abuse of market power in the interests of competition or customers.

Prescribed services

Ports contain one clear example of natural monopoly – shipping channels. The Victorian government chose to confine the regulatory scope to those activities over which port operators were known to have significant market power. These activities were termed 'prescribed services'.

The following are prescribed services under the Port Services Act, 1995, and are under the ambit of the Office of the Regulator-General.

- The provision of channels for use by shipping.
- The making available of berths, buoys, or dolphins in connection with the berthing of vessels in the Ports of Melbourne, Geelong, Portland, and Hastings.
- The provision of short-term storage or cargo-marshalling facilities in connection with the loading or unloading of vessels at adjacent berths, buoys, or dolphins in the Ports of Melbourne, Geelong, Portland, and Hastings.
- The connection of water or electricity to berthed vessels in the Ports of Melbourne, Geelong, Portland, and Hastings.
- Towage in the Ports of Geelong, Portland, and Hastings.
- Until 30 June 1999, pilotage in the Ports of Melbourne, Geelong, and Hastings to which the agreement dated 3 June 1989 between the Marine Board of Victoria and Port Phillip Sea Pilots applies.

Pricing regulation

The Victorian government had committed itself to achieving particular reductions in overall charges at the ports.

- A 33% reduction in the PMA charges over three years.
- A 22% reduction in Port of Geelong over several years.
- Overall reduction of 20% in Port of Portland charges.

The regulatory structure of prices for port services is as follows (see Figure 1).

- Prescribed services which are regulated by the Port Services Act, 1995.
- Competitive services which are offered on normal commercial terms and conditions.

Regulation of prices under pricing orders is principally achieved by fixing a maximum average revenue in relation to

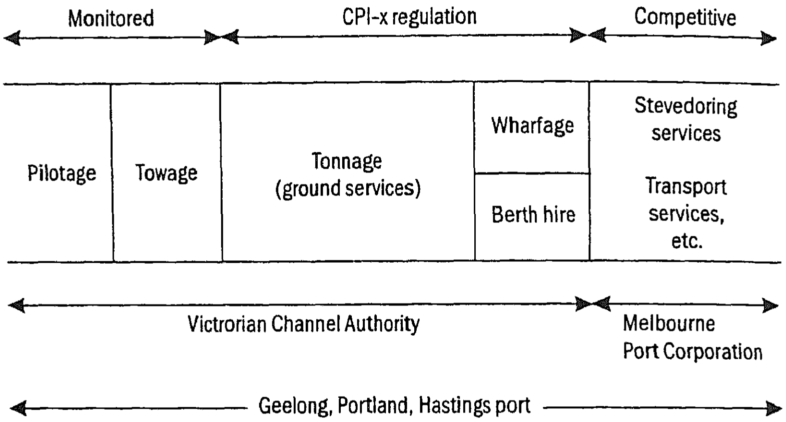


Figure 1 Regulation of port services

regulated services provided by each regulated service provider. The pricing orders require the Office to approve regulated prices for each financial year. This includes increases in existing regulated prices or regulated prices for new or additional regulated services that may be provided from time to time.

The purpose of requiring these approvals of regulated prices is principally to enable the Office to be satisfied that regulated prices comply with the maximum weighted average revenue cap under the pricing orders and are otherwise consistent with the objectives.

Exempt contracts

Regulated services provided under long-term contract are exempt from the price cap, on grounds that if the parties are able to bilaterally agree on terms and conditions from positions of equal strength, there is no compelling economic reason for a third party to impose conditions to protect one or other of the initial parties to the contract.

Channel usage

Channel usage (or tonnage) charges apply for the provision of channels for use by shipping. Each vessel arriving in the relevant port waters may be charged channel usage calculated by reference to the tonnage of a vessel or in any other manner permitted under the pricing orders. Different channel usage charges may be determined in respect of different vessels or class of vessels; or different cargo or class of cargo; or according to the length of time a vessel is in the relevant port waters.

Wharfage

Wharfage charges apply for the provision of short-term storage or cargo-marshalling facilities in connection with the loading or unloading of vessels at adjacent berths, buoys, or dolphins. Wharfage may be calculated by reference to the quantity, volume, weight, or value of cargo loaded or unloaded at the site. Different wharfage charges may be set in respect of a site or class of sites, or cargo or a class of cargo, or a vessel or class of vessels, or according to other such factors.

Berth hire

Berth hire charges apply for making berths, buoys, or dolphins available in connection with the berthing of vessels. Different berth hire charges may be set in respect of a site or class of sites, or cargo or class of cargo, or a vessel or a class of vessels, or according to other such factors.

All wharfage and channel usage charges are payable on demand by the MPC, the VCA, or the channel operator who may appoint agents for the collection of these charges. Annexes 2–5 give the initial schedule of prices for each of the ports.

Port promotion levy

An occupier or licensee of land within the Melbourne port area (other than the MPC) must pay port promotion levy to the MPC. The amount of the port promotion levy is to be determined by the MPC with the approval of the minister. Different amounts may be determined as the port promotion levy in respect of different land or classes of land, or different occupiers or licensees, or class of occupiers or licensees. The port promotion levy is payable to the MPC at such time or times as the MPC determines with the approval of the minister. The port promotion levy is not payable after the expiration of two years from the commencement of the Port Services Act 1995.

Port promotion fund

The MPC must establish and maintain a fund to be called the port promotion fund. The MPC must pay amounts received by it as port promotion levy and any other money given to it specifically for the purpose of promoting the use of the Port of Melbourne for maritime commerce into the port promotion fund. Money standing to the credit of the port promotion fund must be applied in the promotion of use of the Port of Melbourne for maritime commerce.

Price controls

Price caps

In respect of price capped regulated services, the pricing orders specify the government's initial prices until 30 June 1997.

- The weighted average revenue cap which applies a CPI-x (consumer price index-x) formula to price movements between 30 June 1997 and 30 June 2000.
- The principles and administrative procedures for varying charges under the CPI-x price caps.

Weighted average revenue price caps

The pricing orders apply a CPI-x weighted average revenue cap to the prescribed prices.

Under the formula, a port authority's average price for a financial year cannot exceed its MWAR (maximum weighted average revenue) cap. The authority's MWAR cap is calculated by reference to

- its weighted average revenue in the base year (the financial year 1996/97) escalated according to the CPI escalation since the base year
- less the effect of the X factor applied to the particular authority
- taking account of the particular authority's under- and over-recovery of price capped average revenue from the previous financial year.

All charges for price capped regulated services are to be converted into a measure 'per tonne' for the purposes of the MWAR cap irrespective of their unit of charge (flat annual fee, explicit charges on weight, volume, mass, or time measures, or any other agreed commercial method).

X factors

The X factors are legislated to achieve compound real price reductions, from 30 June 1997 to 30 June 2000 as shown in Table 1.

Price control formula for weighted average revenue cap

The Office may approve a new or revised schedule of maximum prices if the Office is satisfied that the regulated prices comply with the port's MWAR cap and they are consistent with the objectives.

Maximum weighted average revenue cap

Each regulated entity must ensure that the AR (average revenue) derived from regulated services in a particular financial year after the base year does not exceed the MWAR cap for that financial year.

Table 1 X factors (cumulative) of ports and channels (%)

Port/channel	1997/98	1998/99	1999/2000
Port of Melbourne	10	20	30
Port of Hastings	0	0	0
Port of Geelong	0	0	0
Port of Portland	4	8	12
Victorian Channels Authority	12	24	36

The AR and MWAR are to be calculated accordingly as follows.

The AR derived from regulated services provided by a port in financial year 't' is to be calculated as

$$AR_t = \frac{R_t}{T_t}$$

where

AR_t = the AR (in dollars/tonne) derived from all regulated services in year 't'

R_t = the total revenue (in dollars) derived from regulated services during year 't'

T_t = is the total quantity of cargo (in tonnes) which is loaded or unloaded by the port regulated services during year 't'.

AR_t, R_t, and T_t are to be calculated on the basis of reasonable forecasts by the port.

The MWAR for a particular port is to be calculated as

$$MWAR_t = (CPI_t - X) \times WAR_t - K_{t-1}$$

where

$MWAR_t$ = the MWAR (in dollars/tonne) for all regulated services provided by that port in year 't'

CPI_t = the CPI for financial year 't' as defined in the pricing orders

X = an annual adjustment factor applied for financial year 't' consistent with the definition of the CPI (which accumulates from the March quarter in the 1995/96 financial year).

WAR_t for a port is calculated as

$$WAR_t = \sum_{p=1}^{p=n} \left[AR_{p,b} \times \left(\frac{T_{p,t}}{T_t} \right) \right]$$

where
b = the base year, being the year ending 30 June 1997;
$AR_{p,b}$ = the AR (in dollars/tonne) is calculated as

$$AR_{p,b} = \frac{R_{p,b}}{T_{p,b}}$$

where
$R_{p,b}$ = the total revenue derived from regulated services (cargo category 'p') during the base year
$T_{p,b}$ = the tonnes of cargo category 'p' that is loaded or unloaded in the port during the base year
$T_{p,t}$ = the reasonable forecast in tonnes of cargo category 'p' which will be loaded or unloaded in the port utilizing regulated services in year 't'
T_t = the forecast in tonnes of all cargo which will be loaded or unloaded during year 't'
$\sum_{p=1}^{p=n}$ = requires the summation over all cargo categories.

For cargo categories in any year, which was part of the base year 'b', the Office may make adjustments as it considers necessary to WAR_t.

K is a correction factor that adjusts for the difference between forecast AR and MWAR and estimated AR and MWAR based on nine months of actual data.

- K_{t-1} is zero for 1996, 1997, and 1998.
- After 30 June 1998, K_{t-1} is to be calculated as
  $K_{t-1} = AR^a_{t-1} - MWAR^a_{t-1}$

where
AR^a_{t-1} = is the AR (in dollars/tonne) for year t−1, but substituting for forecast revenue and tonnes the actual revenue and tonnes for the first 9 months of the financial year t−1 and annualizing them using the factor (*actual results for 9 months/9)* × *12*
$MWAR^a_{t-1}$ = is the MWAR for financial year t−1 but substituting for T_t and $T_{p,t}$ the actual values for the first 9 months of the financial year$_{t-1}$ and annualizing them using the factor (*actual results for 9 months/ 9)* × *12.*

The Office may, in accordance with the pricing orders, increase, decrease, or adjust the basis for calculating the AR, MWAR, WAR_t, or K_{t-1}.

New maximum weighted average revenue estimates and prices
If new prices are introduced, then a port must give the Office written notice of the regulated prices proposed to be charged; and sufficient information to enable the Office to assess whether the proposed regulated prices would comply with this order, including AR and MWAR cap for the financial year.

Regulated pass through of cost elements related to force majeure
If a force majeure event occurs or continues, a port may give notice to the Office requesting approval for it to pass on the costs of the event to users of regulated services by an increase in regulated prices.

Challenges of the future

The Office under the Act is required to conduct and complete an inquiry to determine for each port 'whether or not prescribed services are to be subject to price regulation and the form of that price regulation'. This work must be completed, as per current legislation, by 1 January 2001.

Endnote

This paper draws on the *Annual Report 1997/1998*, Office of the Regulator-General; *The Reform and Sale of Ports in Victoria*, Privatisation and Industry Reform Division, Department of Treasury and Finance, October 1998; *Pricing Order for the Port of Geelong*, Gazetted, 1 August 1996; *Pricing Order for the Port of Hastings*, Gazetted, 26 June 1997; *Pricing Order for the Port of Melbourne*, Gazetted, 26 November 1996; *Pricing Order for the Channels in the Ports of Melbourne and Geelong*, Gazetted, 29 October 1996; *Pricing Order for the Port of Portland*, Gazetted, 4 March 1996; and the homepage of the Office of the Regulator-General at www.reggen.vic.gov.au.

Annex 1

A description of Victorian Ports

Table 1 Workforce

Authority	1985	1988	1990	1995
Port of Melbourne	1451	1424	1337	558[a]
Port of Geelong	179	224	222	147
Port of Portland	104	102	108	46

[a] January 1994

Source Data obtained from the Department of Treasury and Finance

Table 2a Financial returns: Port of Melbourne Authority

Percentage	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
Return on assets	2.7	1.0	0.2	4.9	5.3	6.1
Return on equity	−1.3	−3.3	−5.3	2.5	3.3	1.0
Debt to equity	36.0	45.4	58.5	56.5	52.9	48.6

Table 2b Financial returns: Port of Geelong Authority

Percentage	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
Return on assets	NA[a]	NA	−0.4	6.8	6.2	NA
Return on equity	NA	NA	−0.4	7.0	6.3	NA
Debt to equity	NA	NA	6.1	3.3	2.3	NA

[a] not available

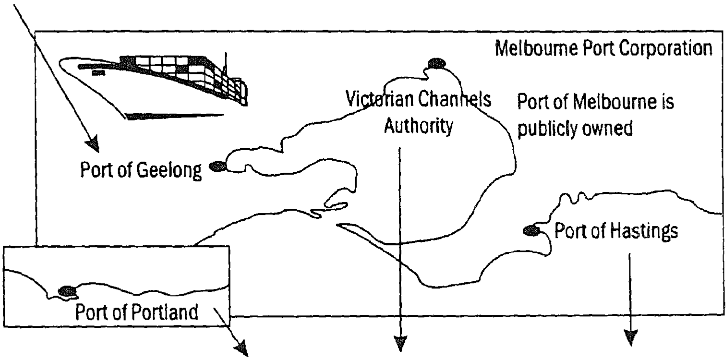
Table 2c Financial returns: Port of Portland Authority

Percentage	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
Return on assets	NA[a]	NA	NA	−0.6	1.9	−1.8
Return on equity	NA	NA	NA	−4.8	12.5	−4.1
Debt to equity	NA	NA	NA	38.5	45.9	35.5

[a] not available

Major Victorian ports

Port of Geelong sold to TNT.
Port of Geelong shipping
channels managed by VCA
Recreational areas retained
in public ownership.


Melbourne Port Corporation
Victorian Channels Authority
Port of Melbourne is publicly owned
Port of Geelong
Port of Hastings
Port of Portland

Port of Portland sold to Infratil Australia. Long-term arrangement with VCA to manage and maintain Portland's shipping channels. Recreational areas retained in public ownership.

The VCA is a public authority responsible for harbour control, management, and navigation in Victorian channels.

Port of Hastings sold to TNT. Recreational areas retained in public ownership.

Annex 2

Schedule of prescribed prices for the Port of Portland

Initial schedule of prices for regulated services

1 Port tonnage rates
- Per GRT per visit: $0.73 or
- Per GRT per hour (up to two days): $0.0152

2 Berth hire rates
- Cargoes loaded or discharged using ships gear and/or mobile conveyor/handling systems: $187/hour
- Cargoes loaded via the GEB shiploader system and cargoes discharged direct into storage from self discharge vessels: $170/hour
- Bulk liquids loaded/discharged via pipelines: $130/hour
- Cruise ships and other non-cargo vessels: $130/hour
- Vessels undertaking repairs: $130/hour
- Reefer cargoes: $107/hour
- RORO and other cargoes requiring heavy duty berth: $260/hour

3 Wharfage rates (payable by the tonne, cubic metre, or kilolitre of cargo loaded or unloaded as determined by the port operator)
- Bulk goods loaded by pipeline, conveyor, or grab: $0.27
- Livestock (sheep): $0.03 each
- Livestock (cattle and horses): $0.17 each
- Bulk goods discharged by pipeline, conveyor, or grab: $0.51
- All other goods: $0.63

4 Berth and mooring fees for fishing vessels (effective up to 31 October 1996) (per metre per annum)
- Trawler berth
  - Single alongside: $372.00
  - Double alongside: $186.00
- Fishermen's wharf
  - Single alongside: $116.00
  - Double alongside: $58.00

5 Berth and mooring fees for fishing vessels (effective from 1 November 1996) (per metre per annum)
- Trawler berth
  - Single alongside: $560.00
  - Double alongside: $280.00
- Fishermen's wharf
  - Single alongside: $175.00
  - Double alongside: $87.50

6 The initial cargo categories for use in the Port of Portland (additional cargo categories may be determined by the Office or existing categories deleted by the Office in accord with the pricing order).
- Freezer: Meat, tallow, butter, cheese

- Fertilizer: phosphate rock, sulphur, potash, soda ash, ammonia sulphate
- Fertilizer liquids: sulphuric acid
- Grain: wheat, barley, oats, safflower, peas, faba beans, canola, lupins
- Livestock: sheep, goat, cattle
- Other bulk: silica sands, petroleum products, fodder
- Timber products: softwood woodchips, particle board, timber packs
- Smelter berth: alumina, petroleum coke, fluid coke, aluminium fluoride
- Smelter liquids: liquid pitch
- Smelter other: aluminium ingots, bath
- Miscellaneous: fishing vessels

Annex 3

Schedule of prescribed prices for the Port of Melbourne

Initial schedule of prices for regulated services

Area hire for berth areas
The charge calculated on total time from the start of storage of export cargo prior to the arrival of the vessel until the end of storage of import cargo; area rent to double in rate for use of area greater than three days (72 hours) after finish of vessel discharge (six days or 144 hours for timber cargoes).

Saturday and Sunday are included but 'closed port days' are excluded. 'Closed port days' are Good Friday, Christmas, Picnic day, ANZAC day, and Labour day. Cost calculated to the nearest one-tenth of an hour rounded upward.

1 Berth (dollars/hour)
- South Wharf
  - 21: 78
  - 26: 5
  - 28: 28
  - 29: 28
  - 31: 39
- Victoria Dock
  - 2: 28
  - 3: 28
  - 4: 28
  - 16A: 31
  - 16B: 34
  - 16C: 38
  - 17A: 45
  - 17B: 45
  - 22: 34
  - 23A: 41
  - 23B: 34
  - 24: 34
- Appleton Dock
  - E: 17
  - F: 12

Berth hire
The charge calculated on the total time of vessel at berth from first line ashore to last line cast-off. Cost calculated to the nearest one-tenth of an hour rounded upwards.

Any berth designated by the manager, property development, as a 'lay by' berth shall be charged at $42.50 per hour. A 'lay by' berth shall not be used for the transfer of cargo and the berth may only be designated as a 'lay by' berth where, in the opinion of the MPC, the operations of the port are not impaired.

1 Berth (dollar/hour)
- South Wharf
    - 19: 122
    - 21: 106
    - 26: 42
    - 27: 74
    - 28: 90
    - 29: 90
    - 31: 111
    - 33: 191
- Victoria Dock
    - 2: 106
    - 4: 106
    - 16: 239
    - 17: 239
    - 22: 106
    - 24: 106
- Appleton Dock
    - B: 159
    - C: 159
    - D: 180
    - E: 90
    - F: 90
- Webb Dock
    - 3: 239
    - 4: 239
    - 5: 239
- Station Pier
    - OESP: 133
    - IWSP: 133
    - OWSP: 133
- Breakwater Pier: 180.00

2 Berth (dollars/hour)
- Cruise liners (24 hours minimum charge): 133.00
- Gellibrand Pier: 239.00
- Yarraville
    - 1: 239.00
    - 6: 154.00
- Holden Dock: 214.00
- Maribyrnong: 154.00

3 Wharfage (non-containerized/general cargo charges are based on the weight or volume of the cargo, whichever is greater) (dollars/tonne or cubic metre)

- Inwards
  - Overseas: 1.29
  - Coastal: 1.29
  - Empty returns: 0.41
  - Transhipments: 0.64
- Outwards
  - Overseas: 1.29
  - Coastal: 1.29
  - Empty returns: 0.41
  - Transhipments: 0.64

4 Containerized cargo (charges are based on the length of the container; rates for 8' and 9'6" height containers to be same as for 8'6" height. Rates for 40' [12.2 m] length containers to be twice that for 20' [6.1 m] length) (dollars/20' container)

- Inwards
  - Overseas
    - Dry: 37.40
    - Insulated: 37.40
  - Coastal
    - Dry: 37.40
    - Insulated: 37.40
  - Empty: 10.88
  - Transhipment: 18.69
- Outwards
  - Overseas
    - Dry: 37.40
    - Insulated: 37.40
  - Coastal
    - Dry: 37.40
    - Insulated: 37.40
  - Empty: 10.88
  - Transhipment: 18.69

5 Bulk cargo (dry and liquid only) (dollars/tonne or cubic metre)

- Inwards
  - Overseas
    - Crude oil: 1.29
    - Phosphatic rock: 1.29
    - Other: 1.29

    - Coastal
        - Crude oil: 1.29
        - Phosphatic rock: 1.29
        - Other: 1.29
- Outwards
    - Overseas: 0.92
    - Coastal: 0.77

Cargo categories

The initial cargo categories for use in the Port of Melbourne are described below.

1 Overseas container trade
- Loaded containers handled at berth with an agreement
- Empty containers handled at berth with an agreement
- Loaded containers handled at berth with no agreement
- Empty containers handled at berth with no agreement

2 Coastal general cargo trade
- Accompanied passenger vehicles
- Loaded containers and other general cargo
- Empty containers

3 Overseas break bulk
- Motor vehicles
- Timber
- Other break bulk

4 Liquid bulk
- Crude oil and other feedstock
- Imported petroleum products
- Other liquid bulk imports
- Overseas exports of petroleum products and other liquid bulk
- Coastal exports of petroleum products and other liquid bulk

5 Dry bulk
- Import
- Export

Annex 4

Schedule of prescribed prices for the Port of Geelong

Initial schedule of prices for regulated services

1 Berth hire rate (dollars/hour)
- Bulk grain pier: 191
- Corio quay: 74
- Lascelles wharf: 134
- Refinery pier: 243

2 Facility hire rate (dollars/hour or part thereof)
- Bulk grain pier: 36
- Corio quay: 69
- Lascelles wharf: 173
- Refinery pier: 82

3 Cargo categories: the initial cargo categories for use in the Port of Geelong are given below.
- Bulk liquids
- Bulk grain
- Woodchips
- Fertilizer
- Aluminium raw materials
- Other dry bulk
- Logs
- Steel
- Bagged grain
- Other break bulk

Annex 5

Schedule of prescribed prices for the Port of Hastings

Initial schedule of prices for regulated services

Tonnage rates (dollars/GRT/hour)
- Foreign vessels: 0.0105
- Foreign vessels (over 72 hours): 0.0052
- Coastal vessels: 0.0079
- Coastal vessels (over 72 hours): 0.0039

Calcutta Port Trust,
Calcutta
Swapan Chakrabarti

Tariff setting: changes in port pricing

Transition to a liberalized environment: experiences and issues in regulation 305-307

Port tariffs

Change in structure

The structure of port tariffs changes over time (Box 1). These changes occur in response to market pressures. Where ports are state-owned monopolies, these changes occur as a result of comparisons with the more progressive ports that develop new structures to improve their performance. Where ports are privately operated, the changes occur in response to pressure from users to conform to best practices and to provide tariff structures which will facilitate the efficiency of freight transport.

Box 1 *Change in structure*

Resource port	Service port	Landlord port
▪ Detailed wharfage ▪ Equipment hire ▪ Gear rental ▪ Gang shift and overtime	▪ Simplified wharfage ▪ Stevedoring ▪ Wharf handling ▪ Receiving/delivery ▪ Consolidation/ deconsolidation	▪ Terminal handling charge ▪ Royalty

Change in function

Broadly speaking, there are three strategies for setting price (Box 2). The most commonly referred to is cost-based pricing which is interpreted to mean fully allocated costs though it was originally intended to mean marginal cost.

The next is performance-based pricing in which the tariff is used to allocate fixed resources which are in short supply, in particular wharf space and storage. Here the tariff is part of the incentives used to influence the port users to be efficient.

The third is value-based pricing which is designed to raise revenues to cover fixed costs in a manner that will have the least impact on the volume and growth in traffic.

It is relatively simple to assign specific tariffs to these strategies, but the way in which the tariffs are actually used depends on whether the port is acting as a monopolist, an efficient operator, or a competitor.

Box 2 *Change in tariff function*

Monopoly → Competition

1 Cost-based
  - Handling, cargo services
  - Detailed → simple, bundled

2 Performance
  - Dockage, storage
  - Income → efficiency

3 Value-based
  - Port dues, wharfage
  - Large, detailed → small, simple

Monopoly versus competitive ports

The difference between monopoly ports and competitive ports is the difference in approach to the client when setting prices (Box 3). The monopoly port sets prices in isolation and with a 'take it or leave it' approach. The competitive port sets prices in consultation with the users to determine how the required increases can be achieved without creating a significant disadvantage for individual users. It is well established that port users are willing to pay more for improvements in the quality of service. Competitive ports present tariff changes as a quid pro quo for these improvements whereas monopoly ports introduce tariff changes because they need more money to cover their costs.

Box 3 *Change in process*

Monopoly →	Competitive
▪ Administrative	▪ Consultative
▪ Cost recovery	▪ Commercial
▪ Across the board	▪ Selective
▪ No change in structure	▪ Revised format
▪ Not linked to	▪ Associated with
• services	• new services
• quality	• improved quality
	• investment

Simplified structure

Perhaps the most fundamental change in the structure of port tariffs is the simplification of tariffs including a reduction in the number of charges and the extent of differentiation of changes plus the bundling of services under single changes (Box 4). Simplified structures are easier to manage, lead to

Box 4 *Simplified structure*

1 Easier to
  - revise
  - collect
  - regulate
2 Transparent
3 Promotes efficiency
4 Competitive

higher returns because of limited opportunities for misinterpretation, and result in more rapid and less costly collections because the users can anticipate the charges.

The thrust of port competition has been to reduce the charges to the bare minimum for a complete package of essential services and to allow the port to charge for additional value-added services. The latter, over time, become essential and are incorporated into the complete package as has happened in the automotive industry.

Creating efficiency: role of tariffs

There are reasonable questions as to the role of tariffs in creating efficiency (Box 5). In the case of modifying port users behaviour, pricing can provide an additional incentive to the port users to behave in ways that will enhance this productivity. The practice of offering a lower rate for palletized cargo was a classic example of this. However, these incentives must be backed by management supervision. In respect of encouraging port management to be more efficient, tariffs are a less effective mechanism than competition and/or conscientious management.

Nevertheless, there are options for changing the structure of the tariff to encourage both the user and the port to be more efficient. Tariffs can be used to force the management to change operational practices to earn a profit under new tariff structures and to create conditions in which users can operate more efficiently.

Box 5 *Can tariffs create efficiency?*

1 User efficiency
  - PSA performance rebate
  - Peak price
2 Port efficiency
  - Fiji gambit
  - Inverse performance rebates
  - International container tariff
  - Cargo to vessel charges

Jawaharlal Nehru Port Trust, Mumbai

M P Pinto

Regulation in the port sector

Transition to a liberalized environment: experiences and issues in regulation 308-311

Need for a regulatory mechanism

No discussion on the privatization of infrastructure in India is complete without considering the need for a suitable regulatory mechanism. Indeed, conventional wisdom dictates that an independent regulatory body is an essential condition for privatization. The role of regulatory bodies has now been expanded to cover not merely what price should be charged for services rendered, but what standards should be set for the provider of services. This paper examines the relevance of the regulatory authority for the port sector.

Typically, regulation is considered essential wherever the provider of services functions in a monopoly or near-monopoly situation. The regulatory authority is considered necessary even when the monopoly service provider is the state. The idea is that the consumer needs to be protected against any arbitrary or capricious fixation of prices without reference to the cost of providing the service. The idea is also to ensure that the special concessions given to a particular group under any programme of affirmative action by the state does not come at the cost of other groups of consumers. In other words, the state must fund its special programmes out of its own resources and not by targeting other groups of consumers.

Other sectors

Transport

The need for such regulation is best seen in the case of nationalized road transport and the power sector. Regarding nationalized road transport, when the exclusive right to run stage carriages vests with the state, the customer is well within his rights to ask for some measure of protection against the arbitrary fixation of fares. An inefficient public utility which has a poor record of maintenance usually seeks to cover this up by charging higher fares. When the hapless customer has to pay for the fact that the utility's fuel efficiency is such that it records the lowest kilometre per litre, he needs the protection of an independent body which will ensure that he does not suffer merely because of the inefficiency of the utility.

In another scenario, an irresponsible management determined to buy industrial peace and popularity at all costs can enter into wage agreements that place an impossibly high burden on the utility. This is sought to be passed on to the consumer in terms of higher fares. Because the utility functions as a monopoly, the consumer has no redress. He must either avail himself of the services of the utility or do without. In both these eventualities, the role of an independent regulatory authority is of paramount importance. The customer must be protected against arbitrary decisions which are taken, not with regard to the reality of the market situation, but to cover up for inefficiency or mismanagement. The customer must also be assured that the utility providing the service in a monopoly situation is not charging exorbitant rates and thus earning monopoly profits. The task of the regulatory authority is, therefore, to ensure that inefficiency is punished, that the consumer is not penalized for it, and that rates or fares are not distorted by unduly high returns.

Power The case for regulating power supply is even stronger. By privatizing roadways, a measure of competition is introduced which ensures that the consumer is not at the mercy of one supplier. Even if power supply is privatized, the consumer does not have the option of taking power from the suppliers of his choice. He must get his supply from the utility in whose jurisdiction he falls. He can at best compare the standard of service that he receives and its cost with what is prevalent elsewhere, but there is no way in which a customer in, say, Orissa can get power from the local supplier in Mumbai or Delhi. This makes the case for protection of the consumer through an independent agency even stronger. The effects of low availability, frequent outages, and low plant load factor must not be put on the hapless consumer. Similarly, the costs of populist measures like free power supply to certain sections of the community should be paid for by a suitable budget provision and not by recovering the costs from those customers who are not the beneficiaries of state largesse. If the staff of a particular utility is given a bonanza by way of wage settlement, this should not be at the cost of regular consumers.

Ports

The scenarios described above point to the clear need for a regulatory agency in certain sectors, not only to ensure that the utility earns only fair and reasonable profits but also to ensure that it functions at certain internationally accepted levels of efficiency and does not pass on the effects of lax management and profligacy to the consumer. Typically, therefore, consumers need protection in monopoly or near-monopoly situations. Is this the case in respect of ports? Till recently, the answer would have been an emphatic yes. Indian ports faced no competition and in most cases laid down the law in their own ports without any fear of losing customers or facing a downturn in business. Their main concern was how to reduce the time that ships spent outside their berths waiting for a chance to avail of their services. The law made it clear that they were under no obligation to compensate the customer for any loss, even if it was caused by their own carelessness or inefficiency. In such a scenario, there was a crying need to protect the consumer by fixing rates and ensuring that ports did not pass on the consequences of their incompetence to consumers through higher tariffs.

The developments in the last few years have changed all this drastically. Where formerly ships had to wait in hope for a chance to enter an overcrowded Indian port, they now have choices. On the west coast where the major part of India's foreign trade takes place, shippers have the choice of using the Mumbai Port, the Jawaharlal Nehru Port, the privately-owned and managed Pipavav Port, or even the newly developed Mundra Port further north. Before long, they should also have the choice of operating out of the Vadhavan Port. Each of these ports will compete with each other to woo customers by competitive tariffs and superior service. They will not need a regulatory authority to ensure that their charges are reasonable. The sheer imperatives of the market will do the trick far more effectively than any outside agency.

Nor is this the only choice that shippers will have. Not only will they be able to choose between different ports but even within a port they will be able to choose between different suppliers of the same service. At the Jawaharlal Nehru Port, the container terminal of the port authority lies cheek by jowl with another container terminal of almost the same length set up by a private operator on a BOT (build, operate, transfer) basis. Which terminal the shipper patronizes will depend on the kind of service offered and the charges levied. Nor is the move to induct private operators confined to the Jawaharlal Nehru Port alone. At Kandla, a container berth and the operation of container freight system have been offered for private bids. At Mumbai, four berths are to be privatized. Bids for the operation and extension of the existing container terminal have been received at Chennai. Cochin's ambitious 800-million-dollar container terminal expansion has attracted the attention of at least 14 well-known players. The Haldia Dock Complex has started the tender process for a container terminal. To quote Peter Norfolk, Deputy Editor, *Container*

Management, the arrival of more and more private terminal operators will lead to faster turn around times, greater efficiencies, and increasingly high throughput levels.

This is just the kind of healthy development that will benefit port users and authorities alike. To ensure a fair deal for everyone, conditions in which the consumer has choices must be created. Instead, the response has been to bring in one more regulatory agency whose avowed aim is to use the tariff leverage to affect improvements in operational efficiency of major ports and private operators. Our experience with regulation in different sectors in the several years since independence has not been such as to create a high level of confidence in its ability to address the questions involved. Instead, why not create conditions in which open competition will protect the consumer and at the same time bring about maximum efficiency in port operations?

Our argument against this can be that as things stand today there will be several ports which are effectively regional monopolies and that nothing is going to change this in the foreseeable future. Evidence does not support this view. All over the country, whether in Vizhinjam, Kerala or Kulpi, West Bengal, more and more new ports are coming up. The movement is often orchestrated by state governments, which perceive port development as an ideal way in which to open up their territory to more investment. Thus, the Gangavaram Port is being planned near the existing major port in Vizag, the Orissa government is eager to start the Dhamara Port near the existing Paradip Port and in Karnataka, a competitor to the New Mangalore Port will be seen in Karwar. In fact, with port development becoming the buzzword, there may be a case for a regulatory authority to protect existing ports and ensure that the multiplicity of new ports does not lead to sickness in the industry.

Conclusion

A regulatory authority is really needed when monopoly conditions prevail. Even then, the better way to tackle the problem is probably to get rid of the monopoly rather than try to regulate it. In other words, it is always better to let the market do the regulation. Of course, there will inevitably be areas where natural monopolies exist or where for one reason or another governments are unable or unwilling to phase out monopolies. In such cases, regulatory authorities are necessary, but where open and healthy competition can be ensured, there is no better way to protect the interests of the consumer and generate the greatest efficiency.

Gujarat Pipavav Port Ltd, Mumbai

Nikhil Gandhi

Regulatory reforms: present and future strategies

Transition to a liberalized environment: experiences and issues in regulation 312-315

To augment existing port facilities of major/minor ports by public/private enterprises and to encourage new private or joint sector ports, an essential prerequisite is that initiative should be taken by the government to remove the regulatory aspects of existing acts, which presently act as constraints or deterrents. The appropriate central/state government agencies should simultaneously ensure that the pace of implementation of such measures is speeded up and assured within a specified time frame. Reforms may be brought about as short-, medium-, and long-term strategic plans and dovetailed with the national plan for implementing integrated infrastructure imperatives.

Suggested reforms

Major Port Trusts Act

The Major Port Trusts Act, 1963 should be scrapped and all major ports should be converted into corporations / public limited companies under the Companies Act. In this context, the recent initiative by the government wherein the Union Cabinet gave the green signal for corporatization of the JNPT (Jawaharlal Nehru Port Trust), Ennore, and Haldia ports is a welcome move. This will facilitate both qualitative and quantitative improvements in existing major port infrastructure rendering them more efficient, effective, and competitive in the context of globalization of the Indian economy. The corporatization process will also facilitate resource mobilization from indigenous and external debt markets which, in turn, will ensure project implementation as per specified time schedules.

Labour laws and reforms

The augmentation of existing port facilities by financial inputs will not necessarily per se enhance the productivity of major ports and render them efficient, effective, and competitive unless and until simultaneous and commensurate labour reforms are brought about. At present, major ports have the constraint of excess and redundant labour and are governed by the Dock Labour Board Act and the conditions of contract of the local port trust. In this context, the recent suggestions in the report submitted by the Task Force on Infrastructure set up by the Honourable Prime Minister of India under the chairmanship of Mr Ratan Tata need be implemented immediately.

- Private operators entering any expansion/new work in major ports should not be forced to adopt the existing labour laws and practices.
- The wage structure and provisions specify that the wages paid by private operators should not be less than the wages being paid by the Major Port Trusts for similar work. It is imperative to remedy this situation and ports should have the freedom to buy out the redundant labour because their continuity would only result in major and economically fatal delays. Simultaneously, higher productivity levels/ norms, commensurate wage structure, and incentives based on productivity must be adopted. One measure can be freezing further employment and specifying higher productivity levels for existing labour.
- As per existing provisions of build, operate, and transfer agreements, the responsibility of all the labour employed passes over to the licensee on termination of the licence. This should be changed and the responsibility should switch over to the new licensee.

Financial resources

There is no denying the need for huge investments both by the public and the private sectors to quicken and consistently ensure integrated port infrastructure development. In this context, government budgetary allocations have to be enhanced; provisions have to be made for facilitating and removing regulatory hurdles for private sector funding; and users of ports such as warehousing and container corporations, exporters, importers, transport operators, stevedores, and clearing and handling agents should become investors apart from being users.

Attainment of objectives

Interest rates

The existing interest rate structure for financing port projects by Indian financial institutions / banks is high, considering the long gestation period of port development projects. There should be a special level of interest rate structure, and regulations to that effect should be implemented. For example, the resources raised from the recent Resurgent India Bond were primarily for integrated infrastructure development and substantial funds were mobilized. However, the basic objective of making cheaper funds available to the infrastructure sector from this source was defeated as a large part of the money has been placed with financial institutions and banks at 12.75%–13% interest. With further mark-up by them, the cost of funding for infrastructure projects from this source has not come down. Regulations have to be changed such that infrastructure projects receive funding directly and at a reasonable cost of a maximum of 11% interest.

Long-term debt financing

Certain natural sources of long-term debt financing are public provident fund, provident fund, insurance, etc., as also resourcing by tapping household savings. There is a need for wide reforms to ensure that most of such funds, which are presently under the control of the government, flow into the financing of port infrastructure development projects.

Low-cost funds

In order to make the port project commercially viable, the entrepreneur requires low-cost funds. Such funds are available only in the international market where the rate of interest is comparatively low. However, considering the long gestation period and the dollar–rupee parity over a period of time, the ultimate cost of funds in the international market is also bound to increase. The effective rate of interest, therefore, will become higher. The Ministry of Finance and the Ministry of Surface Transport should consider extending the same benefits, by changes in regulations, to the port authorities as are given to exporters in the country. Port authorities earn foreign exchange by way of vessel-related charges from international shipping lines which call at ports. These charges are collected in US dollars, but are required to be converted into Indian rupees immediately. If the port authorities are allowed to retain a certain portion, if not all, the foreign exchange earned for meeting their debt repayment commitments, then the effective rate of interest will not rise, even if the dollar–rupee parity fluctuates adversely. In that case, a sizable amount of low-cost funds will flow in, which will ultimately give a boost to overall port development. Similarly, to provide foreign exchange risk coverage vis-à-vis low-cost foreign currency participation in the project, cargo-related charges should be allowed to be denominated in dollar terms but collected in rupees at the prevailing market rate.

Tariff regulatory authority

The regulations pertaining to the terms of reference of TAMP (Tariff Authority for Major Ports) should encompass the aspects of safety and conservancy but not tariff control mechanisms. TAMP has been set up specially to put caps on tariffs which, in the context of huge investments and commensurate returns, is out of the question. Tariff fixation should be left to individual port authorities and should be market-driven as per the demand and supply position and based on the services provided and competitive aspects. If a particular port assures faster turnaround time and least or no detention/demurrage charges for shipping lines, it makes better commercial/business sense to the port user to avail the facilities of that particular port. Hence, there should be no caps on port tariffs.

Conclusion

The above reforms in regulations may help to attain the macro-objective of kick-starting integrated port infrastructure development projects and formulate medium- and long-term strategies. Both central and state governments are aware of this. However, timing is of utmost importance and the pace has to be faster for ensuring timely implementation.

Summary of question and answer sessions

Transition to a liberalized environment: experiences and issues in regulation 316-317

The focus of the question and answer sessions was on the conflict of interests that may arise from the government having both regulatory and commercial interests in the same sector. Thus the setting up of an independent authority was important alongside corporatization of all commercial activities. Here two issues arise (1) of the regulator having the mandate to protect the port users in case the port authority exploited its monopoly power, thus using regulation to surrogate competition and (2) of funding the activities of such an authority.

In this respect, some of the international experiences of port regulation by an independent authority was described, especially that of the US and Australia. A rational pricing scheme is a process whereby the interests of the port users are protected while at the same time giving port authorities ample flexibility to be creative in setting port charges and providing investment incentives. One such process is the principle of marginal cost pricing where the revenue requirement identified is used to decide a price cap. There was some debate on whether the benefits from more competition and a rational pricing policy would actually be passed on to the consumers or absorbed by middlemen.

On the issue of funding the activities of the regulator, a consensus was reached that some source of funds will have to be devised. Alternatively, the government would have to be responsible for the non-commercial activities of the port such as the social and environmental costs.

It was also mentioned that the role of the regulator would only arise when monopoly situations arise and not otherwise. In cases where competitive markets are functioning, good regulation would mean no interference.

Issues of a level playing field were also raised. The fact that the existing ports already had considerable social and environmental obligations, which could not be offloaded instantaneously, would considerably impede their operating on commercial norms. Ports today do not pay any taxes and their bottom lines could be affected if they are subjected to tax regulations in a liberalized environment. The location of ports was also of some concern in that some ports, by virtue of being positioned close to each other, could affect each other's profits.

In a study, RITES had stated that excess capacity existed in the ports based on internationally accepted benchmarks. The benchmarks used in the RITES study were a contentious issue. However, the major ports are building more capacity by building more berths, attracting private capital for leasing more waterfronts, and attracting floating tenders for equipment.

It was concluded that regulation is necessary in a situation where competition is not available and once competition picks up there can be a whittling down of arrangements, as one view expressed. At the same time, another view was that even when competition does prevail there would still be a requirement for some regulatory arrangement.

Telecom

Session 1 Regulatory framework

Session 2 Market structure

Session 3 Tariff setting

Session 4 Regulatory reforms: present and future strategies

■

Background paper
Rakesh Kapur

■

Experiences and issues in telecom regulation
T H Chowdary

■

Regulatory frameworks for developing countries
Mahesh Uppal

■

Regulatory aspects: industry's view
T V Ramachandran

■

New Telecom Policy 1999: suggestions for formulation
S Kulkarni

■

Regulatory framework
Virat Bhatia

■

Competitive multi-operator environment in developing markets
M Z Doja

■

Optimizing investments without compromising competitive benefits
Ashok Barat

■

Market structure
Richard D French

■

From monopoly to competitive market regulation: the Massachusetts experience
James Connelly

■

Tariff setting: a Canadian regulatory perspective
Fred G Bigham

■

Tariff setting and cost separations: a company's point of view
Dave Lindsay

■

Tariff settings
S P Purwar

■

Tariff policy: some considerations
Harsha Vardhana Singh

■

Impact of the new telecom policy
K Vijay Rao

■

Current scenario and recommendations for the future
Hemant Luthra

■

Microeconomic analysis of Indian market conditions
Eric Buerkler

■

The Australian Competition and Consumer Commission in the open competitive telecommunications market
Allan Asher

Telecom Regulatory Authority of India, New Delhi

Rakesh Kapur

Background paper*

The GoI (Government of India) ushered in an economic reform process in the early 1990s. This initiated intensive policy and structural changes in various economic sectors to enhance the rate of economic growth in a sustained way. These measures included rationalization of the tax structure, reduction in government expenditure, financial sector reforms, dismantling of numerous irrational regulations in the industrial sector, and a more liberal regime for foreign investment. The new economic policy focused on liberalization, delicensing, and deregulation. Apart from encouraging private participation in core sectors, it encouraged private initiative in the development of infrastructure. However, the lack of fully transparent policies and political motivation, coupled with the continuation of licensing in many sectors, was responsible for very little actual private participation. Nothing substantive has been achieved so far in this regard. In fact, the sluggish pace of reforms in the infrastructure sector and inadequacies in terms of quality, quantity, and efficiency in infrastructure facilities have dampened the pace of overall socio-economic development in the country.

Opening up of the telecommunications sector in India

The GoI acknowledged the need for a world-class telecom network in the country to facilitate global competitiveness and accelerate exports and inflow of foreign direct investment, which in turn would stimulate economic activity. This necessitated telecommunications reforms to introduce competition in the interest of lower costs, lower prices, greater innovation, better service for consumers, and increased investment in the sector. Following a gradual gradient, liberalization of the telecom sector was initiated with the opening up of telecom equipment manufacturing in 1991 and inviting private sector participation in a phased manner for e-mail, voice mail, data services, audio and video-text services, radio paging, and cellular mobile services.

* This paper was prepared for TERI by the author. The paper presents the author's personal views.

These service segments were opened to private investment in 1992. Cellular mobile telephone services was opened up with two new service providers in each circle operating against fresh licences.

National Telecom Policy, 1994

The NTP (National Telecom Policy), 1994 was another step in this direction, reiterating the government's commitment to pursue these reforms aggressively. The objectives defined by the NTP, 1994 included the availability of telephones on demand, provision of world-class services at reasonable prices, and universal availability of basic telecom services to all villages. The policy recognized that the resources required for achieving these objectives would not be available with the government and that private investment was essential to bridge the resource gap. The NTP, 1994 also initiated competition in basic telephone services by permitting one new entrant in each circle to compete with the incumbent (DoT [Department of Telecommunications] / MTNL [Mahanagar Telephone Nigam Limited]). Private sector entry has, however, been slower than what was anticipated in the NTP, 1994. Basic telecom services by private operators have only just commenced in a limited way in two of the six circles where licences were granted. Some of the targets envisaged in the NTP, 1994 have remained unfulfilled, thereby raising concerns regarding further development of the sector. In spite of the rapid roll-out of cellular mobile networks in the metros and circles with over one million subscribers currently, most of the operators are in the red. Actual revenues realized by these projects have been far below the projections. The high licence fees have eroded their viability further. Many operators are unable to achieve financial closure for their projects.

Status of the telecom sector in India

In the telecommunications area, India is identified as one of the top markets in the Asia–Pacific region and perhaps the largest market after China for foreign companies. At the end of March 1998, the telecom network in India consisted of 23 406 telephone exchanges with equipped capacity of 21.26 million lines and 17.8 million telephone connections. Of the 14.54 million DELs (direct exchange lines) in 1997, about 50% of the telephones were installed in 19 cities. New Delhi and Mumbai account for about 25% of all telephone connections in India. Of the 600 000 identified villages, only half have the facility of a public telephone. The remaining villages are proposed to be covered by the year 2002. In spite of achieving an annual compounded average growth rate of 16.5% in the telephone network over the period 1991–97, the estimated waiting list for telephones stood at 3.34 million as on 31 March 1997.

The DoT's monopoly in domestic long-distance traffic has continued except for the carriage of intra-circle domestic long-distance traffic by new entrants in basic and cellular services. The VSNL (Videsh Sanchar Nigam Limited), a government-owned company, has monopoly in international long-distance traffic. The government has a commitment to the WTO (World Trade Organization) to review the present policy on domestic and international long-distance services in 1999 and 2004, respectively. Internet and GMPCS (Global Mobile Public Communication System) services were opened up for private participation on more liberal terms during the last quarter of 1998. Apart from open entry, the licence fee has been waived for ISPs (Internet service providers) who have also been permitted to set up international gateways for Internet traffic, reducing VSNL's monopoly. A revenue-sharing arrangement has been proposed for the payment of licence fee by GMPCS service providers.

Annex 1 gives the status position on different segments in the telecom sector in India.

Legislative framework

Even during the liberalization phase, the telecommunications system in India continued to be governed by the provisions of the two archaic pieces of legislation, namely the Indian Telegraph Act, 1885 and the Indian Wireless Act, 1933. Hardly any amendments were carried out to recast these Acts and make them consistent with or appropriate for handling the rapid changes and emerging requirements.

A special regulatory framework is particularly important in the early stages of market liberalization to ensure effective competition, more so in the area of public utilities such as telecommunication services, which till recently were considered natural monopolies best owned and managed by the state. Appreciating its inevitability, the modalities for setting up an independent regulatory authority were conceived in January 1994. TRAI (Telecom Regulatory Authority of India) was, however, positioned in March 1997 as a statutory authority.

Since fundamental changes have taken place in the telecom sector, the immediate need is to replace the Indian Telegraph Act, 1885 and the Indian Wireless Act, 1933 with a new forward-looking telecommunications act. The new Act must be equipped to handle the changed market and technological conditions in the telecom sector as well as comprehensively address the situations arising due to the convergence of telecommunications, broadcasting, and information technology.

Approach to reforms

While the initial sequencing of reforms in the telecom sector was not proper, the overall policy framework and institutional arrangements have also not been very conducive to effect accelerated reforms in this sector. Functions of the policy maker, licensor, and incumbent service provider have continued to vest in the single agency, namely the DoT, resulting in a conflict of interests in its different roles. In spite of the government's reiteration of segregating the service provider function of the DoT from its policy-making/licensing functions, nothing concrete has materialized as yet. Instead of converting the service provider entity into a corporate entity, as announced earlier by the government, the latest proposal under consideration contemplates setting up a separate department of telecom services as a precursor to corporatization. The continued concentration of these functions in a single agency, which is also the dominant incumbent, has been another hindrance to promoting effective competition. New entrants have perceived a lack of objectivity and reciprocity, anti-competitive behaviour, and restrictive covenants in the DoT's approach to policy formulation and implementation. A host of problems encountered by new entrants in the areas of provision of resources and interconnection could have been avoided if the service provider function of the incumbent had been separated from the DoT, instead of allowing someone to be the judge of his own cause.

TRAI was set up much after liberalization was introduced. Even thereafter, the DoT showed scant consideration to the recommendatory functions mandated to TRAI under the TRAI Act, with regard to compliance of terms and conditions of licence, introduction of new service providers, revocation of a licence, and dispute settlement. In fact, the DoT resorted to litigation by challenging the scope of the provisions of the TRAI Act to keep the regulator from discharging its functions. Even the Delhi High Court ruling on the DoT's challenge of these provisions at the first appellate stage went against TRAI. A large number of disputes between the DoT and service providers are pending a final verdict of the court on jurisdictional issue as the matter is now sub judice before the division bench of the high court.

Defining the regulator's role

During its existence of less than two years, TRAI exhibited a high degree of independence and competence in regulating the sector by providing a level playing field among operators in the private and public sectors based on the principle of non-discrimination and control on anti-competitive practices by the players. The regulator is addressing the challenge of reconciling the public policy objective of consumer protection and affordability with that of adequate return on investments for the incumbent and the new entrants to ensure growth of the sector in the period of transition from monopoly to an open competitive market. Tariff rebalancing was identified as the priority area warranting reforms to foster competition, protect consumer interest, and bring efficiency in provision of services. The ongoing exercise in TRAI is a step in this regard to rationalize the tariff structure by making it cost-based with market-oriented pricing for all services, in an unbundled manner and with complete transparency. The new tariff structure would also provide scope for innovative ways of revenue generation by service providers, inject sustained viability in their operations, and encourage fresh investment for boosting development and strengthening the telecom network. This exercise has also flagged off a debate on the extent of subsidization of a class of subscribers and/or certain services beyond the USO (universal service obligation).

Other priority areas of work include building up an interconnection regime which promises seamless interconnection among networks on a non-discriminatory principle of access with regard to physical, technical, pricing, and other commercial aspects, including revenue sharing. A model framework for interconnection is in the offing. The regulator has also embarked upon consultations in other areas such as quality of service and customer satisfaction, and accounting separation and recommendatory functions such as the terms and conditions of a licence agreement. These steps are directed towards providing a world-class regulatory regime.

There is an urgent need to strengthen TRAI and delineate its role with comprehensive powers and clear authority to enable it to perform effectively in ensuring rapid development and enhancement in the communication sector. Ambiguities, if any, arising out of different interpretations of some of the provisions of the TRAI Act need to be sorted out through appropriate amendments in the Act. In case the licensing function continues with the DoT, the power for adjudication over dispute between the licensor and the licensee must be vested in TRAI to generate investor confidence. The government must mandatorily seek TRAI's recommendations on various policy issues and matters related to the development of the telecommunications industry even if such recommendations are not binding on the government. These issues are currently being debated in the context of the new telecom policy under consideration by the government.

Convergence of technology and policy framework

Apart from the constraints in effective roll-out of the telecom network, there have been recent far-reaching developments worldwide in the telecom, IT (information technology), broadcasting, and media industry. The convergence of markets and technologies is forcing a realignment of the industry. Telecom and broadcasting industries are encroaching upon each other's territories and technology is blurring the difference between various conduit systems such as wireline and wireless. The growing trend of transmitting data in digital form is leading to a convergence that makes the distinction between voice, fax data, video, and other forms less relevant as all are carried over the same networks. As in many other countries, separate licences have been issued for basic, cellular, Internet, GMPCS, and cable TV operators each with separate industry structure, terms of entry, and obligations for creating the infrastructure. The convergence, however, permits operators to use their facilities to deliver some of the services reserved for other operators. This warrants another look at the policy framework. Any new telecom policy framework must facilitate India's vision of becoming an IT superpower. It should expedite the development of a world-class telecom infrastructure in the country that can provide a modern, efficient, competitive, and innovative environment for the industry, leading the way for many new social and economic opportunities, which also take into account possibilities emerging from rapid technological changes. Incidentally, a draft paper on the New Telecom Policy, 1999 was released by the government on 23 January 1998 for eliciting wider public debate before the new policy is formulated.

Scope of universal service obligation

There is the need to redefine the precise scope of the USO so that connectivity is rapidly provided to all uncovered areas apart from the provision of high-level services (such as Internet and Integrated Services Digital Network) capable of meeting the demands of the country's expanding economy. An appropriate funding mechanism must also be devised to ensure the availability of resources for meeting the USO.

A new policy framework must recreate the environment that is capable of attracting the required levels of substantial investment for accomplishing the projected growth on all fronts of service segments.

Spectrum management

Allocation of frequency spectrum and the current procedures for obtaining security clearances have been the other major bottlenecks in delayed commissioning of various projects. This area needs drastic reforms with a transparent process of spectrum allocation along with a complete review of procedures and relocation of the existing frequencies. The proliferation of new technologies would further increase the demand on the spectrum. In fact, spectrum management can be better handled if it is assigned to an independent agency like the regulator.

Licensing

Licensing of operators is another area that needs substantive reforms. The policy of inviting bids for the issue of licences for the cellular and basic telephone services has revealed its pitfalls. High upfront licence fees have created problems of viability and survival of service providers, adding to the difficulties encountered in effecting financial closure. The entire mechanism of licensing needs an extensive public debate to thrash out whether the country needs unreasonable licence fees from the operators (in lieu of operational rights given to them for providing services) to meet the budgetary deficit and thereby increase the cost of service to the subscribers. If at all the licence fee has to be levied, should it not be limited to the extent of the costs involved in administering the licence or some reasonable share of revenues to the operator? Alternative licensing options will have to be explored, which may include segmentation of services and markets by linking investment opportunities and applications. While the system of licensing may continue for infrastructure providers, free entry for service providers especially in the access network would perhaps be a better option to give impetus to competition and growth of services.

The extent of competition and the number of operators required in each service area are relevant parameters to decide the terms and conditions of the licence. The structure of the present licence agreement and licence fee has to change as it is not a suitable instrument for infrastructure development. Any future licences must be issued only after the licensing policy is reviewed on these lines. Simultaneously, the problems faced by the existing licensees should be satisfactorily resolved in a legally tenable manner that is consistent with the contractual obligations and does not threaten their sustenance.

Concerns for the regulator

Regulatory concerns with regard to market structure, competition and licensing, resource allocation, pricing, tariff, quality of service, interconnection, USO, and dispute resolution will have to be appropriately addressed not only at the policy level but also at the institutional and implementation levels. This transition has to be regulated in a manner that averts unmanageable upheavals in the existing market structure. At the same time, it is relevant to recognize that the country cannot afford to perpetually lag behind if a gradual curve for introduction of competition is traced. Learning from the experience of other countries, we must now move on a fast track to leapfrog in our endeavour to establish a world-class telecom infrastructure in India.

Opportunities for investment

Low tele-density of about 2 telephone lines for every 100 persons and the vast under-serviced population offer tremendous scope for fresh investment in the telecom sector in India. Each per cent increase in tele-density is expected to effect three per cent increase in gross domestic product growth. In its continuing endeavour to expand the network coverage and to provide new services, the DoT recently formulated a 10-year perspective plan (1997–2007). To meet the objective of providing telephones on demand, this perspective plan has forecast an additional demand of 67.4 million DELs during the period 1997–2007 maintaining the past average growth rate. It is assumed that the private sector will supply 20.4 million lines of this additional demand and the balance 47 million DELs will be installed by the DoT. Accordingly, the perspective plan envisaged an investment requirement of the magnitude of 55 billion dollars for increasing the tele-density to nine per cent at the end of the 10-year period. Apart from internal resources to be ploughed in by the DoT, investment of about 25 billion dollars is anticipated from the private sector for extending the coverage of basic service networks. Additional requirement of funds for providing value-added services has not been quantified.

The financial plight of new entrants in India does not offer much comfort to investors in putting fresh capital at stake. In fact, the continued financial unviability of these service providers extending even beyond their normal gestation period and prolonged delays in corrective policy actions have affected inflow of fresh investment. The high upfront licence fee is cited as the major factor contributing to the financial unviability of a large number of new entrants. For bringing in increased investment for the country, new entrants in the private sector have to be strengthened. Radical policy modifications have to be in position at the earliest, not only in terms of bailout packages for the existing new entrants but also in reinforcing the market environment that improves viability in this sector and facilitates the much-needed inflow of private capital. The competition will, in the long run, benefit consumers and bring in higher tax revenues to the GoI from increased telecom activity.

Annex 1

Table 1 Status of service providers[a] as on 31 December 1998

Name of service	No. of licences issued	Service started
Basic	6	2
Cellular	42	39
Radio paging	137	93
PMRT[b]	103	57
Data network	12	10
Voice mail	11	6
E-mail	15	15
Internet	45	1
GMPCS[c]	1[d]	–

[a] other than the Department of Telecommunications and the Mahanagar Telephone Nigam Limited; [b] paging and public mobile radio trunking; [c] Global Mobile Public Communication System; [d] issued provisionally

Growth in the telecom sector

Basic services

Total PSTN (public switched telephone network) installed capacity: 20 million
PSTN working lines: 17 million
Average growth during last five years: 15%
Tele-density (no. of telephones per 100 persons): 1.92%
Growth in demand: 16.3%
Percentage digitalization: 97.6%
Lines with STD facility: 92%
Rural exchange lines: 2.8 million
Rural penetration: 0.3%

Two circles, Maharashtra and Madhya Pradesh, have two basic operators

Cellular services

No. of licences issued: 42
Service started: 39
Number of cellular subscribers: 1 035 813

Table 2 List of private basic service providers

Name of the service provider	Circle of operation
Reliance Telecom Pvt. Ltd	Gujarat
Bharti Telenet Ltd	Madhya Pradesh
Hughes Ispat Ltd	Maharashtra
Tata Teleservices	Andhra Pradesh
Essar Comvission Ltd	Punjab
Shyam Telelink Ltd	Rajasthan

Centre for Telecom
Management &
Studies,
Hyderabad;
Information
Technology
Adviser,
Government of
Andhra Pradesh

T H Chowdary

Experiences and issues in telecom regulation

Transition to a liberalized environment: experiences and issues in regulation 330-333

Exhibit 1 *Telecom regulation*

1 Indian Telecoms are (till March 1997) a totalitarian regime in terms of the Indian Telegraph Act, 1885

2 Ministry/policy maker; investor/owner/operator; licensor; regulator; arbitrator and (till 1991) sole equipment producer; possessor and allocator of radio frequency spectrum: DoT (Department of Telecommunications)

3 Parliamentary control was/is nominal; from 1981 rates, rentals, lease charges need not be part of the budget demands for grants

4 From mid-1980s, equipment production was progressively demonopolized, beginning with customer premises equipment but there was no independent approvals body (e.g., British Approvals Board for Telecommunications in the UK; self-certification authorized by the FCC [Federal Communications Commission] in the US)

5 Where telecoms had been private company monopolies, as in the US and Canada, they are subject to state regulation through statutory commissions (e.g., FCC, Canadian Radio-television and Telecommunications Commission)

6 Liberalization, privatization, demonopolization of telecoms begun in 1984, curiously at the same time in the US, UK, and Japan

7 Two models of regulation
- Non-operator ministry as in Japan and later in France, Italy, The Netherlands, and others
- Statutory body as Office of Telecommunications in UK and later the Australian Communications Authority in Australia and Office of Tele-communications Authority in Hong Kong

8 The EC (European Community) mandated separation of regulation from operations, preparatory to total competition effective from 1 January 1998. All complied; lapses/appeals against national regulators are with DGXIII – the EC directorate dealing with competitions in Brussels, Belgium (e.g., Italy, Belgium)

Exhibit 2 *National Telecom Policy, 1994: distortions and destruction*

1 The NTP (National Telecom Policy), 1994 launched to liberalize, demonopolize, attract private (domestic and foreign) investment; give telephones on demand; introduce new services; make services universal, affordable; and to make (access) India a telecom manufacturing base to supply to global markets
2 The NTP was doomed ab initio because the totalitarian DoT is to implement the NTP, 1994
3 An independent regulator was not created (till 1998)
4 The incumbent operator is the *licensor of its competitors*, who are also 'thieves' of its markets (new services)
5 The incumbent operator licensor, the DoT, laid down the terms and conditions, unmarked (unannounced and value-unfixed) criteria for licensing: most unjust and unprecedented
6 Highest licence fee offered, and not lowest price for service and least capital required per unit capacity, was the prime consideration (subverts affordability)
7 Complying to unilaterally laid terms for interconnection is a condition for awarding licence
8 No fixed time for allotment of radio spectrum, but fixed time for commencement and rollout of services
9 Unfair interconnection points for interstate and international traffic
10 Monopoly in lucrative and least-cost interstate and international traffic for the DoT and competition in capital-intensive and revenue-poor local and intrastate services, etc.
11 No independent regulator would allow such iniquitous licensing (e.g., the EC pulling up and bringing to heel the monopoly telecoms in Italy and Belgium)

Exhibit 3 *Telecom Regulatory Authority of India: teeth less, truth less*

1 TRAI (Telecom Regulatory Authority of India) brought into being in March 1997 after all licensing was concluded (not before or during) after thwarted attempts by the DoT to create an administrative regulatory wing within the DoT
2 Deficiencies in TRAI
- no mission statement
- members' qualifications, selection, and appointment
- directives from the government (sec. 25)

3 Paramountcy of the Indian Telegraph Act, 1885 (sec. 38)
4 No provision for independent type approvals of customer premises equipment and telecom network equipment and interconnections
5 No consultative bodies of stakeholders (e.g., National & Regional Telecom Users' Councils in the UK)
6 Radio frequency spectrum allocations kept out
7 No budgetary independence
8 Licensor–licensee disputes outside TRAI
9 Recommendations/views of TRAI not mandatory for licensor's (DoT) decisions to induct new operators or comment on terms and conditions
10 Impossible task to create a level playing field between a non-licence fee paying and R&D cess appropriating all-India covering the DoT and its (state limited) competitor private telecoms
11 No regional/state-capital offices of TRAI

Exhibit 4 *Telecom Regulatory Authority of India: trivialized*

1 Reduced to a rehabilitation centre for retired civil servants with no requirement of related talents. The DoT is adversarial and confrontational with a 'couldn't care less' attitude
2 Staffed with the DoT's people, past-master practitioners of monopoly and resisters of competition
3 Control by the DoT through budget grants
4 Engaged in protecting providers', not consumers', interests (e.g., rental and call charge increase proposals)

Exhibit 5 *Rescuing the Telecom Regulatory Authority of India*

1 No employees of the DoT should be in TRAI. Else, they should be drawn from private telecoms also
2 No member of TRAI should be from any operator unless there is a cooling period of five years. Expertise may be obtained through consultants on contract
3 A new telecom act in supersession of the Indian Telegraph Act, 1885 and necessary amendments to the TRAI Act, 1997
4 Appointment of members to be transparent, opportunity for public intervention; nomination of candidates by the ministry but selection/confirmation by a committee
5 Regulation should be heavy suo moto for the incumbent, until its market share falls by 30%, and light for incumbent's rivals
6 Interconnection to be mandatorily imposed unless licensed parties mutually agree within 90 days of licence
7 Corporatize the DoT's operations in a structure to be mirror image of private telecoms as regards area of operation
8 TRAI judgements to be appealable only to multi-member bench of the Supreme Court
9 Bring in spectrum allocation for telecoms under TRAI
10 Positive incorporation of ideas in Exhibit 3

Mahesh Uppal

Telecommunications and Computer Information Systems, New Delhi

Regulatory frameworks for developing countries

Transition to a liberalized environment: experiences and issues in regulation 334-336

Regulatory frameworks are means to deliver policy objectives, and regulators implement policy. A coherent policy is a prerequisite for an efficient regulatory framework. But in India we have an unprecedented situation of a government in legal dispute with its own appointed regulatory body which is supposed to be independent and statutory. The fact that there is a dispute is an indication that the Indian policy is not as transparent as it could have been. Disputes imply a serious mismatch between the government's objectives and political will. Investor confidence suffers when there is a perceived lack of political will. Big investors require significant levels of comfort with respect to the regulatory environments. If there was a match between policy-making and implementation, then a creative tension between a regulator and the government would be healthy. In such a scenario, the regulators would go to the government or vice versa if there was a threat of dispute and iron out their differences because their common objective would be the implementation of a policy.

Developing countries, particularly democracies, also have a higher degree of contentiousness at the policy level. For example, compared to industrialized countries, India has more legislation and more ordinances, which are negotiated not at higher levels but at a relatively medium level. At these levels it is the narrow short-term interests of potential beneficiaries or losers in the process of reform that come into the fore. If regulatory frameworks are to succeed in developing countries, they may have to be a little less ambitious and choose the kind of market structure that will enable them to provide the requisite level of investor confidence, that is sustainable, and at the same time delivers to the consumers the range, quantity, and quality of services without actually leading to an unviable sector. That is really the challenge India faces. The challenge in regulation is to have 'very affordable services' while at the same time ensuring an extremely profitable run.

Regulatory approaches in developing countries reflect the nature of institutions that exist. An effective framework will be one that can reconcile the concerns of the various stakeholders, whether government or private. A regulatory framework will work only if it is 'in sync' with the institutions. If competition legislation is weak, a heavily market-driven approach may not work. On the other hand, if the judiciary in a country is slow or corrupt, a legal approach will not work. In such cases, a competent administrator would be better; but if the bureaucracy is not efficient, an approach which is more judicial may have to be chosen provided the judicial institutions are relatively uncompromised. Countries with limited expertise in regulation will have to actually have to draw up a legislation, and it must be noted here that copycat regulatory frameworks may not work. But if institutions are strong, the job of regulating the market may be entrusted to somebody whose integrity and competence is above board.

Regulation does not imply just market regulation; it includes infrastructure regulation which has a bearing on public policy and strategic issues. Market regulators like TRAI (Telecom Regulatory Authority of India) cannot possibly expect to be involved in political, defence, or strategic issues. Being independent bodies to whom nobody is obliged to report on such matters, they would neither have the competence nor the requisite information. Getting involved in such issues would only undermine their credibility in a contentious environment. As such, the regulators need to be given more control over market structure with politicians having the last word on political, defence, or strategic issues. In other words, the regulators should be able to decide the number of players, the relationship between these, the kind of competitive regulation, the license conditions, and the terms of interconnection. The political aspects of the regulatory process can be separated from the technical or market issues in the areas of licensing, tariffs, and spectrum management (Table 1). Section A is poorly handled if *regulators* do not have the final say, whereas Section B is poorly handled if *politicians* do not have the final say.

A similar issue has arisen about convergence. Most telecommunications (except North America) have little experience of broadcasting content issues. The purposes of telecom regulation may be served if telecom regulators can deal with all 'carriage' (including wireless carriage) and competition/ anti-trust issues. In countries like India, creation of a unified regulator dealing with both content and carriage might cause more problems because the assumptions are not shared and the institutions are not strong enough for effective and efficient decision-making.

Table 1 Technical versus political

Regulatory function	Section A	Section B
Licensing	Need and timing for new players Technical and financial pre-qualification of players	Issues with a bearing on strategic or political issues
Tariffs	Tariffs that raise competition issues	Tariffs that determine affordability of basic services (e.g., price of a local call)
Spectrum management	Speedy, efficient, and fair-priced spectrum allocation	Spectrum allocation for sensitive or strategic use

To conclude, a narrow approach ('either government or regulator') will not work. Neither will narrow sector-based approaches (e.g., telecom and broadcasting). Regulatory frameworks must be based on the careful allocation of functions – it must address the needs for transparency and fairness to users and service providers and must allow for strategic issues to be addressed by governments.

Cellular Operators
Association of
India,
New Delhi

T V Ramachandran

Regulatory aspects: industry's view

Transition to a liberalized environment: experiences and
issues in regulation 337-340

Importance of telecommunications

Telecommunications is a critical infrastructure for every area of the economy. There are a number of knotty problems in this sector...
(Honourable Prime Minister Mr Atal Behari Vajpayee on 24 October 1998)

Telecommunications has been internationally recognized as a public utility of strategic importance.
(Supreme Court Judgement [1996] 2 Supreme Court Cases 405)

In the context of these declarations, it is important to review the judgement of the Supreme Court of India, in the 1995 Delhi Science Forum case. In this event, the Parliament went into limbo for two weeks following problems with the issue of tender and the Supreme Court had to intervene. In its judgement, the Supreme Court pointed out

> *The existence of a Telecom Regulatory Authority with the appropriate powers is essential for introduction of plurality in the Telecom sector. The National Telecom Policy is a historic departure from the practice followed during the past century. Since the private sector will have to contribute more to the development of the telecom network than DoT/MTNL [Department of Telecommunications / Mahanagar Telephone Nigam Limited] in the next few years, the role of an independent Telecom Regulatory Authority with appropriate powers need not be impressed, which can harness the individual appetite for private gains, for social ends. The Central Government and the Telecom Regulatory Authority have not to behave like sleeping trustees, but have to function as active trustees for the public good.*
> (Supreme Court Judgement [1996] 2 Supreme Court Cases 405)

Thus, TRAI (Telecom Regulatory Authority of India) was set up on 28 March 1997 'to regulate telecommunication services and for matters connected herewith and incidental thereto' (TRAI Act, 1997). According to the Draft New Telecom Policy 1999, TRAI was formed 'to provide an effective regulatory framework and adequate safeguards to ensure fair competition and protection of consumer interests'.

Present status

TRAI has done excellent work in many fields, but it is not able to move forward. The ongoing conflict between the DoT and TRAI clearly undermines the role of TRAI as an independent regulator. Till date, most orders of TRAI have been challenged by the industries in the courts. Contrary to the impression in certain quarters, TRAI is not fighting the DoT; it is the industry which is fighting some of the decisions in the courts. Further, a Delhi High Court judgement has resulted in TRAI being reduced to a tariff-setting authority. But in this role too, TRAI is not fully empowered as interconnection aspects are being disputed by the DoT. As a result of this, the already fragile investor confidence in Indian telecom industry has been further shaken.

Recent developments

The Prime Minister's announcement on 24 October 1998 that all outstanding issues between the DoT and TRAI would be resolved to strengthen TRAI was widely acclaimed. However, expert legal opinions clearly state that out-of-court settlement cannot resolve the issue. Proper action is needed to take care of the current situation, which means the TRAI Act has to be amended through an ordinance to give TRAI the status of an independent and empowered regulator. The TRAI Act does give TRAI comprehensive powers, but the problem lies in the interpretation. Following the Prime Minister's announcement, a draft discussion paper on the proposed New Telecom Policy 1999 was prepared. While it has many excellent proposals, it does not address several fundamental issues. One of the most fundamental issues before the telecom sector today is that of regulatory role. The draft paper has failed to address this issue; it talks of two options in a situation where there is no option. In fact, both the options do not satisfy requirements because the DoT or the MTNL is being imposed as the third operator in every service area without the involvement of TRAI. By diluting the powers of TRAI, this draft discussion paper cannot go forward.

Main grey areas

The main grey areas in the interpretation of the TRAI Act are the following.

- Status of TRAI recommendations on licensing
- Adjudication of disputes between licensor and licensee
- Issuance of interim orders

- Determination of WPC (Wireless Planning and Coordination Wing, Ministry of Communications) charges

Status of recommendations on licensing

- The Supreme Court view that 'Subsection (2) of Section 11 of the TRAI Act has also a non-obstante clause, giving overriding effects to the said subsection over anything contained in the Indian Telegraph Act, 1885' (Delhi Science Forum Case)
- The industry understands and fully accepts that TRAI recommendations are not binding on the government, but believes that it is mandatory for the government to seek the recommendations of TRAI

Disputes between licensor and licensee

The DoT views that disputes should be resolved only through arbitration with DG (Directorate General)-Telecoms as arbitrator, as specified in the licence agreement. This is unacceptable since the DG-Telecoms is an interested party.

Section 11 (1)(n) of the Act lists TRAI's power for settlement of disputes without limiting it to disputes related to non-licence. This is further reinforced by the definition of 'service provider' in the TRAI Act. The term service provider as used in this Act is a term of art, and it has certain specific connotations. In Article 2 (1)(j), the Act specifically says that service provider means the government and the licensee. The licensee is any person licensed under a section of the Indian Telegraph Act to provide specified public telecom services. Article 2 (1)(j) does not discriminate or differentiate between the government as licensor and the government as operator. As such, the industry views that the 'settlement of disputes' under Sec. 11 (1)(n) covers disputes with the licensor also. The industry requires it to be clarified that TRAI has powers to adjudicate on all disputes, including those involving the licensor.

Interim orders

Specific powers must be given to TRAI to issue interim orders, i.e., TRAI should have the authority to pass interim orders/directions (and not just issue directions), where necessary. This has to be clearly incorporated in the Act because the very objective of setting up TRAI is to provide expeditious remedy for disputes. In the absence of the power to grant interim relief, the ultimate relief may be unfruitful because telecom disputes are often urgent in nature and require significant and immediate action.

Determination of WPC charges

The TRAI Act does not provide TRAI any role or authority in WPC matters. In many countries, radio communication agencies or the wireless wing is part of the regulatory authority. The WPC charges form an important cost element for service providers. As TRAI has jurisdiction over telecom tariffs, it should also have jurisdiction over WPC charges. To safeguard the interest of the consumer, TRAI must have a say in the determination of WPC charges so that the end tariff can be affordable.

Other recommendations

1 Comprehensive Telecommunications Act to replace Indian Telegraph Act, 1885 and the TRAI Act, 1997 in the medium term
2 Amplify role of TRAI to cover conduit regulation
3 Any appeal to the high court on a TRAI decision should be heard by not less than two judges

An independent and empowered regulator is absolutely essential for the development of a healthy market structure and inflow of huge investments. Investments set the key and the regulator is necessary to safeguard investments and facilitate their flow. There is a crisis in investor confidence today in India. The TRAI–DoT litigation has brought down confidence levels. The highest priority for India today is to seek large investments necessary in the telecom and power sectors. Unless India has a strong regulator who is independent, this task cannot be successful. Amendments to the TRAI Act can remedy the situation and are absolutely essential for advancement.

Conclusion

Communications are not just an industry and a commodity: they are a basic element in developing and reflecting the preferences and perspectives of citizens in all aspects of their lives.

The Government will regulate, where necessary, in the consumer interest, but regulation will be no more than is required to achieve the necessary protection. Wherever possible, the Government will support and encourage the operation of the market to encourage investment and the development of new services. (UK Green Paper on Regulating Communications: Approaching Convergence in the Information Age)

Prime Minister's Office, New Delhi

S Kulkarni

New Telecom Policy 1999: suggestions for formulation*

Transition to a liberalized environment: experiences and issues in regulation 341-342

Five years into the NTP (National Telecom Policy), 1994, we are already contemplating another policy, called the New Telecom Policy 1999 this time round. The very fact that we had to come back to this task shows what a failure the old policy was. It failed firstly because the people who frame the policy and the political leadership that gave the direction for framing it considered licence fee as a source of revenue for fiscal management. This led to very high fixed licence fees from private operators, and landed the entire telecom sector in very knotty problems.

The second factor that caused the failure of this policy was the lack of transparency. It is common knowledge that the motivations of those who framed this policy were suspect; they were not thinking of national benefit.

The third mistake was wrong sequencing, a mistake which has been committed in many sectors where reforms have been introduced. In the power sector, for example, instead of introducing reforms in transmission and distribution, and having a regulatory framework in place first, reforms were made in opening up generation. An equally serious situation occurred in the telecom sector which was opened up without a telecom regulatory act, an authority, or the legal environment in place. The incumbent operator and the monopoly operator, who is even now the policy maker and service provider, determined what regulation in effect was. This has not instilled confidence among investors or the people at large.

The fourth mistake is the entrenched view that the department's interests are synonymous with the national interest, costing the country very dearly. This is partly due to the so-called socialist hangover under which anything in the public sector is considered to be in public interest. This is not strictly true, but in the political class and certainly in the bureaucracy this view is deeply entrenched and could not be changed so far. Due to this, many infirmities can be seen in the New Telecom Policy in its draft form.

---

* Views expressed in this paper are solely that of the author and do not reflect those of his organization.

As the Group on Telecom is non-committal on crucial issues, confidence levels among investors, existing operators, and even the people at large are not very high yet. However, the government has released the draft paper for public discussion. This is the first time that the government has actively sought the views of every party that has anything to do with the promotion of telecom in India to actively participate in policy making. The regulatory framework is conspicuous by its absence; however, there are two alternatives suggested in the draft paper, perhaps both unacceptable to some as both are weak in some respects. To avoid repeating the mistakes committed in formulating and implementing the 1994 policy, every individual, company, or association in the telecom sector must make known their views to the Group on Telecom. The best possible policy can only be formulated through increased and heightened public awareness, especially awareness among critical quarters that matter. Unfortunately, the level of participation of the political class in policy formulation is very low. Therefore, everyone in the telecom sector needs to interact very closely with people in politics. It should not be left to the bureaucrats to decide the policy for India because it may entail a repeat of the NTP 1994 and its implementation would also perhaps be the same. The political class must be engaged in very close dialogue to remove many of the misconceptions that they have. But one should not suspect the presence of political will, without which we could not have come so far. Ultimately, it is national interest that will guide the new policy. On this score, there should be no doubt whatsoever.

AT&T,
New Delhi

Virat Bhatia

Regulatory framework

Transition to a liberalized environment: experiences and issues in regulation 343-345

Legislative framework

The legislative framework of the TRAI (Telecom Regulatory Authority of India) Act includes the Indian Telegraph Act, 1885 and the Indian Wireless Act, 1933. The regulator was conceived in 1994 and the TRAI Act came into force in 1997. In the intermediary four years, these two Acts were subjected to careful deliberations, consideration, and comparison with international models, but no major amendments have been carried out in these Acts. The many powers and functions of the TRAI Act are clearly defined and it includes an unusual statutory requirement to be transparent. Compared to similar acts of various other countries, the TRAI Act is one of the finest.

Issues to be addressed

The regulator needs to address the transition to competition as India has not yet become a natural monopoly. This would protect consumer interest because competition influences prices and affordability. Price-control options and subsidies need to be looked into in the absence of fully developed competition. Work on network interconnection has already begun. Radio-spectrum pricing should go to an independent body. The platform for information infrastructure is on the agenda of the IT (information technology) task force. Promotion of investments is one of the key objectives of the National Telecom Policy, 1994 and the actual reason why private sector investment was mired in the first place. Obligations of licensor and licensee must be addressed to ensure a level playing field.

What is expected of a regulatory institution?

The scope of the regulatory institution would be to work with the dominant operator and monopoly access provider. With the current status for dealing, the monopoly provider is not just a dominant competitor but a monopoly access provider and 95% of calls from cellular and basic rights now go into the incumbent network. That is where the challenge lies as the vast majority of the problems arise because cell-to-cell calls even in the most developed networks are not that high. The degree of independence is critical and can be crucial to the existence of a regulatory institution as are its powers and functions, and licensor and licensee issues. This is one of the main reasons why the concerned players are in the courts today. If there was an empowered regulator who could actually respond to the current state of convergence, financial challenges, and other changes happening in this sector, there would be no need for a policy.

It is rare for any country to create a new policy within four years. While the effort of creating the new policy must be applauded, the need of the hour is an empowered regulator who can take care of these functions and correct the market situation. This has been done several times around the world, including in the US and the UK.

Tariff control options

What type of control should be used? Factors to be considered could be rate of return, price caps, relevance of international benchmarks, rules regarding price discrimination, and dealing with the issue of cross-subsidy. This is the first time in the history of India that local call prices and rentals are being rebalanced as against long-distance call prices in a manner which is scientific and open to public transparency, based on the data provided by the operators themselves. The regulators have come up with some very conservative price elasticity models. The exercise lasted almost a year with hundreds of thousands of man hours and people putting it together. The trend in the government is to actually take away subsidy, move towards actual prices, and then get to the real cost of delivery of end products. This is another issue which concerns international investors and operators because this is the minimum that is expected. For new entrants to be successful, network interconnection is essential. Problems and disputes related to interconnection should be anticipated in terms of both technical aspects and revenue settlement. So a timely and effective dispute resolution mechanism is required.

The conflict

The conflict and the challenge lie in the roles of the Department of Telecommunications as licensor, policy maker, and operator. The challenges seen so far are almost never on the merits of what the operator has said, but on the authority of the operator. There is a lack of anti-competitive laws. The current procedure for interconnection is a result of an executive order, with prices determined by the incumbent operators. This is a serious area of conflict. There is scant or no consideration for the recommendatory role of the regulator. There is no occasion when the government has approached and the regulator has not complied. Regardless of which licensing regime exists, either the licensing is free, or it is controlled by the government. A recommendatory role is mandatory. It is something that the government must seek and consider before it takes a decision on new service providers' entry. Unless the conflicts related to new service providers and licenser issues are resolved, it is very difficult for the regulator. Some of the work has been done by the World Bank, and it is well documented.

Mistakes to avoid

There are big mistakes that need to be avoided while formulating the policy especially with regard to the regulator. Too much advice from the incumbent operators in policy determination is a mistake. The conflict lies in setting up the regulator without resolving the obvious conflicts in the roles of incumbent monopoly as the policy maker and licensor. A suitable, modern, and flexible telecom legislation must be developed. To use this to derive all the power and then make it sacrosanct is something that needs to be avoided. The inflexibility currently exhibited in the amendments should be addressed by a political decision of the government. The authority of the regulator cannot be challenged because it is the government's own regulator.

Foreign investors

From the foreign investors' point of view, this country requires 25 billion dollars over the next four or five years. India has about half a billion invested already through partners. Investors are extremely nervous both at the quality of the policy and the way the entire debate is going on, the regulator specifically. This is sending the wrong message, and litigation is trying the patience and commitment. The conflict between the regulator and the government is causing irretrievable damage because it is setting legal precedence which has a cost of its own. A stable regulatory environment is as important as the market.

Steps forward

An amendment of the TRAI Act is being considered by the entire industry and legal experts. The government must take a serious view of this issue. There must be complete involvement of TRAI in policy formulation and implementation. The right sequence is important. Separation of the various functions of the Department of Telecommunications will resolve this conflict. This is the single most important confidence-building step that the Government of India can take.

Bell Canada,
Ottawa, Canada

M Z Doja

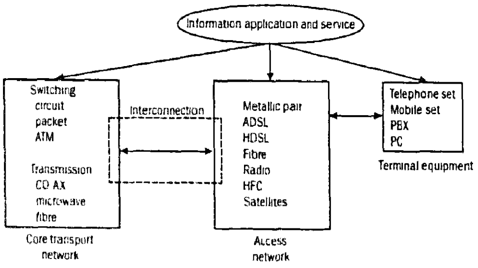
Competitive multi-operator environment in developing markets

Transition to a liberalized environment: experiences and issues in regulation 346-350

Exhibit 1 *Competitive multi-operator environment*

1 Developing markets are moving towards a multi-operator environment involving competition in fixed network and wireless mobile services
2 Major focus is on ensuring investment in infrastructure to meet primary demand for increase in availability of telephony services
3 Risks for market failure are greater and consequences for investor confidence are more severe
4 Need for less reliance on market mechanisms and greater regulatory purview
5 Strong regulatory framework required at start of competition
6 In a multi-operator competitive environment, operators
   - provide competitive telecommunication services to end customers
   - establish network infrastructure to provide these services
   - interconnect their networks to provide access to the end customers of other operators
   - provide and charge for functionalities and services provided to other operators

Exhibit 2 *Generic model access and interconnection*



Note ATM: asynchronous transfer mode; CO-AX: coaxial cable; ADSL: asymmetric digital subscriber line; HDSL: high data rate digital subscriber line; HFC: hybrid fibre copper; PBX: private branch exchange; PC: personal computer

Exhibit 3 *Access and interconnection*

1 In a multi-operator environment for competitive public voice services, access networks become an integral part of interconnection arrangements for domestic and international long distance
2 The attributes of access networks greatly influence and determine the terms and conditions and charges for interconnection
3 In an evolving environment of increasing technical and market convergence, functionality and cost-effectiveness of access networks will have a major impact on the development of all telecommunication services
4 Interconnection arrangements, including access networks, are central to the development of effective telecommunications industry as they
  - enhance effective competition
  - maximize use of telecommunications facilities
  - encourage investment in telecommunications infrastructure
  - ensure users have access to all other users at reasonable cost and acceptable service quality

Exhibit 4 *Access/interconnection regulatory framework*

1 Effective and appropriate regulatory framework should
  - remove barriers and enable more cost-effective development of access networks and interconnection arrangements
  - allow operators to make selection of the appropriate technology option based on business, technical, and economic considerations
  - lead to greater functionality
  - increase effective competition amongst service operators

Exhibit 5 *Pricing, resale, and unbundling*

1 Most significant commercial elements of interconnection arrangements are
  - interconnection pricing
  - resale of service
  - unbundling of functionalities and network elements
2 Terms and conditions and market positioning of these commercial elements have a great impact on how competition evolves in a multi-operator environment

Exhibit 6 *Interconnection pricing*

1 To ensure effective competition, interconnection prices must
  - have the right structure
  - be set at the right level

2 If set too high, they deter efficient market entry or lead to inefficient duplication of resources
3 If set too low, they encourage inefficient market entry
4 In a newly competitive market, setting prices must recognize
  - dominance of the incumbent
  - retail prices being out of balance with costs.

5 With full competition, market forces lead to cost-based prices for both retail and interconnection services

Exhibit 7 *Resale*

1 Service-based competition (resale) involves the use of some service elements of the incumbent by the entrant in offering competitive services
2 It involves varying degree of value-addition
  - very little or no value-addition as in the case of resale using arbitrage
  - substantial value-addition as in data service provided through renting of leased lines

3 In service-based competition, the service provider does not deploy its own network infrastructure
4 Facilities-based competition involves the use of alternative competing network elements owned by the service provider to offer competitive services
5 Resale can promote the development of a competitive market while allowing new entrants to build their own facilities
6 In developing markets, there should be some constraint to ensure that focus on infrastructure development is not diminished
7 Regulatory judgement and discretion are required:
  - to establish charging principles which prevent undue arbitrage by the entrant
  - price signals are conducive to economic investment in infrastructure

Exhibit 8 *Unbundling*

1 Unbundling of incumbent networks into discrete elements enables competitors to combine their own facilities with those of the incumbent in the most efficient manner thus stimulating competition
2 Unbundling should extend beyond monopoly controlled bottleneck functionalities to functionalities and service features that are subject to dominant supply by the incumbent
3 Unbundled network elements
   - local loops
   - switches – local and toll
   - transmission facilities
   - network interface devices
   - operational support systems
   - signalling systems
   - databases – call-related
4 Essential facility is defined as
   - monopoly controlled facility, function, process, or service
   - required by the competitor as input to provide service
   - entrant cannot duplicate it economically or technically
5 Essential pricing of facilities based on causal incremental cost with appropriate mark-up for fixed common costs
6 Of all the unbundled network elements, local loops are considered potentially important for local service competition in many countries as they lead to
   - stronger and faster competition
   - more efficient use of telecommunication resources
   - reduced environmental damage

Exhibit 9 *Universal service obligation*

1 Universal service obligation entails making basic telephony services available to all at an affordable price
2 In high tele-density countries, the focus is on meeting this objective. Usually the incumbent has this obligation and, in a competitive environment, is considered the carrier of last resort
3 In low tele-density countries, the focus is on making progress towards universal service
4 To ensure competitive equity and maximize economic efficiency in subsidy arrangements, USO (universal service obligation) should be funded separately and not included as a part of interconnection charges

Exhibit 10 *Universal service objective*

1 In low tele-density countries, the telecommunications policy needs to set appropriate universal service objectives different to those in high tele-density countries
For example
   - 10–15-year target for network build
   - short-term objective of a telephone in every village of a certain size
   - not appropriate to give incumbent operator a USO to supply services to all who ask for it at affordable price

2 Universal service obligation on the incumbent is counter productive as it
   - leads to inefficient network build
   - tempts the incumbent to demand inappropriate funding for its long-term network build from other operators

Telstra India
Private Limited,
New Delhi

Ashok Barat

Optimizing investments without compromising competitive benefits

Transition to a liberalized environment: experiences and issues in regulation 351-354

Introduction

As we move towards multi-operator markets in public services, every public utility licensor or regulator is confronted with the classical dilemma of choosing between free competition and the large-scale investments such proliferated competition requires.

On the one hand, the consumer is entitled to 'choice' and on the other hand, capital resources have to be protected against unnecessary duplication and suboptimal utilization. This debate assumes special significance in a capital-scarce country, particularly where competition is being introduced against government monopoly in an environment of conflicting socio-political demands.

Conventionally, 'infrastructure sharing' is resorted to in order to optimize investments. As it however does not address the problem of enforcing competition among service providers, it does little to support the enhancement of the product or the service.

The 'Netco/Servco' model of service provision addresses the issue by recognizing the distinction between 'providing access' and 'providing service' in a pyramid-like structure whereby the customer gets the broadest interface of choice by exploiting a largely common technical infrastructure offered by a few competent and strong infrastructure operators.

The model

There are two basic models for the provision of telecommunication services: the 'end-to-end' model and the 'Netco/Servco' model. Under the end-to-end model, one company owns, operates, and maintains the network and markets, and supplies services to end-users of that network. This model has been adopted by Telstra in Australia and closer home by the DoT (Department of Telecommunications), MTNL (Mahanagar Telephone Nigam Limited), and other cellular and basic operators.

In the Netco/Servco model, the responsibilities are divided between a Netco and a Servco. The Netco owns, operates, and maintains the network and the Servco acquires services in bulk from the Netco and resells the services to end-users. In other words, the Netco is the technical player, and the Servco is the marketing and distribution player who competes in the market, sets prices, and contracts with the customer. (The current licensing regime in India prohibits 'assignment' which in a sweeping embrace precludes this opportunity.) This model has been used in Australia by Vodafone which has appointed several Servcos. The Draft Telecom Policy, 1999 has sought to introduce the concept of 'other service providers'. It is presumed that the policy envisages these to be inter alia the Servcos.

There are intermediate models as well. For instance, Telstra in Australia has adopted the end-to-end model, but distributes services through agents and dealers at the same time. However, it still 'owns' the customer and sets the retail prices.

Individual businesses have the option of choosing their role according to their competencies, i.e., whether to be a Netco or a Servco or both.

It may appear strange as to why any business would choose to be only a Netco. But a power distribution company can utilize its 'passive' infrastructure upgraded with a small investment to run a Netco business unit.

Rationale

The Netco/Servco model reduces the levels of infrastructure without diminishing in any manner the customer interface potential. It recognizes that different corporations have different competencies. For instance, an engineering-based organization would be more adept at owning, operating, and maintaining a network, while a marketing-oriented organization with retail focus will be expert at selling services and dealing with customers.

The other important rationale for this model (particularly relevant to India) is that the territorial, delivery, and application matrix adopted for licensing has often resulted in heterogeneity in provider identity, branding, and product and service quality. Due to the basic flaw of adopting territorial licensing on the basis of political boundaries rather than 'economic zones' some of the operations are destined to remain suboptimal for a fairly long time. This may result in either continuation of monopoly or apathy to further investments. The Netco/Servco model helps create service synergy as well as territorial contiguity and thereby economies of scale.

A Servco can, therefore, service a large territory with the entire suite of services with a common brand, defined standards of service, and pricing terms that offer value for money. In a nutshell, the Netco/Servco model captures the concept of 'convergence' from the non-technology dimension.

Key issues in a Netco/Servco arrangement

- The obligations of each party must be clearly delineated. Netco is responsible for building, operating, and maintaining the network; Servco will procure and sell the services to customers, provide customer service and all related activities such as billing and collection.
- A transfer price must be established, with a review mechanism.
- One of the most important issues is exclusivity, that is, can more than one Servco be appointed (and if so, is there to be a 'most favoured nation' clause in favour of a given Servco to the effect that it will always have the best price?) and, importantly, can Netco under any circumstances itself retail services (for instance, once Servco has reached a particular market share)? Exclusivity is very important to Servco as its relationship with Netco will change fundamentally, if Netco competes in the retail market.
- Netco must be allowed to enter into interconnection arrangements with other carriers for the origination and termination of calls, sale of excess transmission capacity, and sharing of facilities.
- Is Servco to be an exclusive Netco reseller, or can it sell services from other networks (both within and outside the territory and/or service domain)?
- There may be a 'take-or-pay' obligation on Servco assuring Netco of minimum committed revenue. This will be of particular importance if Servco is the only reseller.
- Will Netco arrange for the termination of calls originated by Servco customers, or will Servco arrange for the termination of those calls? In the former case, Netco will be entitled to charge Servco a higher wholesale price.
- Standard provisions such as term, termination, and change of control are required. Term is of particular importance if there are exclusivity rights for either party.
- It is essential that Netco is required to meet particular network performance, coverage, and capacity specifications. Netco may also seek of Servco particular minimum customer service standards and particular levels of customer take-up although this may be dealt with through a take-or-pay mechanism.
- Netco must be required to continually upgrade and improve the network and to ensure that new generation services are offered over network. The parties must agree about the basis upon which the costs of any upgrades / new service developments will be shared between Netco and Servco. Reciprocally, the Servco would need to commit to defined delivery parameters of service, etc.

- Servco would normally want an express right to appoint its own sub-resellers, dealers, agents, etc., and also create its own brands and marketing packages.
- The basis, frequency, and type of number allocation by Netco to Servco must be agreed upon.

Role of the regulator

The role of the regulator becomes crucial in an environment where the customer gets insulated from the infrastructure owner and also in situations where the infrastructure provider may also own the customer directly.

The key issues that need to be addressed are

- timing of entry and terms and conditions of service
- guidelines for becoming a Netco or Servco or both, that is, credentials, competencies, etc.
- governing the relationship between the Netco and the Servcos to ensure arm's length dealings, transparent pricing without discouraging competitive bargaining
- regulating dealings between Servcos inter se to prevent unfair trade practices and cartelization and establishing sound charging principles
- audit of Netcos to ensure non cross-subsidizing of services and earning reasonable returns on its product portfolio to ensure adequate incentive for continued investments.

Tata Communications Limited, Hyderabad
Richard D French

Market structure*

Transition to a liberalized environment: experiences and issues in regulation 355-361

Introduction

There has been much discussion about the entry of additional operators into core telecommunications markets such as cellular and basic services. Licensees have discovered that they vastly overestimated the demand for telecommunications services, and probably the capacity of people at the upper tip of the income pyramid in India to pay. The reasons for this overestimation include the short time given for the preparation of bids, the uncritical enthusiasm for one of the last large under-served markets in the world, encouragement and even manipulation by the DoT (Department of Telecommunications) with a view to generating public revenue, residual Licence Raj mindsets of the domestic partners, wireless frenzy on the part of international investors and financial advisers, and simple bad judgment on the part of the bidders. Furthermore, one bidder's extraordinary aggressiveness authorized all kinds of speculation in the media as to possible cartels among the other bidders to keep prices uneconomically low.

Scope and pace of liberalization

In this scenario, there does not seem to be enormous economic space for additional operators. Nor are the existing cellular operators demonstrably abusing the duopoly market structure, though the interaction among estimated and actual demand, greenfield capital commitments, and uncertain licence fees admittedly leaves the issue open to empirical verification.

Talk of additional operators may be no more than a political fig leaf intended to provide a quid pro quo for reform of the structure of the licence fees. On the other hand, it may be intended to speed up the rationalization of the industry by lowering the value of the licence in the hands of any first generation licensee. Rationalization would be a desirable development. There are too many operators, running too many sub-economic and underfunded telecom operations, in

* Views expressed are that of the author and does not engage Tata Communications Limited nor the House of Tata.

the country today. India does not need the 50-plus core telecom operators.

However, there is another mechanism to accomplish speedy rationalization. Following a revision of the terms and conditions as regards licence fee obligations, the Government of India could ensure stringent application of the revised format, which is most unlikely to be sufficiently radical to save all of the current licensees. This would speed up rationalization, with less potential wastage of scarce capital than might be occasioned by third parties entering supply of cellular or basic services. There will still be wastage, but this mechanism should reduce it.

Open entry does not appear to be an optimal policy for a large developing country with an acute shortage of capital for infrastructure and demonstrated weak demand for the services. Some form of licensing will be necessary. Ultimate licensing power should be in the hands of the executive branch, not the regulator, assuming that the executive branch is appropriately structured to competently and credibly carry out the licensing function, though this is not the case in India today.

The first task is to create conditions under which there is some reasonable prospect that the sunk capital costs incurred by the existing telecom licensees may generate an economic return, before taking steps to attract additional entrants into the sector. At the moment, the Indian telecommunications sector may be underfinanced, but it is, welfare externalities and the interstate long-distance network aside, overcapitalized under the current demand and licence conditions. This scenario should determine the scope and pace of liberalization in services other than the interstate long distance. In short, instead of new entrants for existing markets, new markets are needed for existing entrants.

Preparation of competition: its timing and modalities

The regulator should provide the executive branch with a public and grounded recommendation regarding new entrants into core telecom markets. The executive could then proceed to license in light of TRAI (Telecom Regulatory Authority of India) recommendation. This does not seem to be the present direction of the telecom policy revision of 1999; however, it is entirely justified to the extent that the DoT, the major telecommunications operator and erstwhile monopoly supplier, remains in the grip of its own corporate self-interest. If India had a proper independent ministry of communications with uncompromised commitment to the declared telecom policy of the government, such a ministry should have the responsibility, on behalf of the Government of India, for final determination and licensing of additional entrants.

For the same reasons of institutionalized conflict of interests, interconnection terms and conditions cannot be left to negotiations between an incumbent with no incentive to agree and entrants who must interconnect as soon as possible and are poorly placed to wait out the incumbent. The regulator must intervene forcefully. This is one of the few areas where TRAI failed. After letting it be known during the months of August and September 1997 that it was disappointed in the slowness of the industry in bringing interconnection issues to its attention, TRAI took many months to produce a letter of decision which decided none of the most critical issues. The private entrants need interconnection terms and conditions which treat the interconnecting parties in symmetrical fashion and which reflect international practice, and they need them soon.

As long as the structure of the DoT remains unreformed, TRAI will need to develop means for the rapid disposal of issues which flow from the variety in the quality and attitudes of chief general managers in various circles, both operational and central. Some circle administrators have been extremely professional in their relations with the private licensees, while others have been obstructive or dilatory. The latter need the discipline of a regulator who can quickly rectify the results of capricious, disinterested, or arbitrary management of interconnection, leased line, and other issues where the interests of entrants and their customers are at stake.

Resale, network unbundling, and alternative infrastructure

Resale and lease of unbundled network elements are mechanisms devised in the liberalized telecom regimes in the West in order to foster a transition to full facilities-based competition. They are best thought of as temporary measures designed to put pressure on former incumbents possessing market power and bottleneck facilities. Within a regulated tariff structure, entrants without facilities are offered opportunities for price arbitrage, the rationale for which is to give the consumer a choice of suppliers during the period when facilities-based suppliers are constructing their networks, and to force the incumbent to accelerate its adjustment to competitive market conditions.

Unless the DoT and the MTNL (Mahanagar Telephone Nigam Limited) are given the freedom and the mandate to undertake such an adjustment – (that is, unless they are corporatized and then privatized, and given the freedom to shed staff, determine compensation and personnel policies, and drive tariffs toward underlying costs) – it is hard to imagine a resale regime which would make economic sense. There is no sign that the Government of India is prepared to pay the political cost of confronting the public sector undertakings to this extent. In the absence of this kind of political programme, resale would simply deprive the incumbent of monopoly rents, which would accrue to private entrepreneurs having made minimal investments. Facilities-based competition then seems the more logical policy.

Perhaps it is worth emphasizing that the problems of Indian telecom are not fundamentally problems of lack of competition, nor indeed of liquidity, but of underlying economic viability. The issue of viability does not end with the issue of the structure and quantum of licence fees. The industry needs fewer operators, with lower costs per subscriber; larger territorial coverage; and a greater variety and size of revenue sources. Policy should focus on this as a first priority.

The question of alternative infrastructure seems to be very pertinent. The major opportunity here is to assure efficient and rapid provision of alternative interstate long-distance facilities. For reasons which are unclear, the DoT seems to be unable to provide interstate long-distance capacity sufficient to meet peak hour demand. Furthermore, India is committed to review its interstate long-distance monopoly in 1999. This is an excellent moment to exploit the capacity existing in the hands of public entities like the Power Grid, the SEBs (state electricity boards), and the Railways, as well as in the hands of the private cellular and basic operators, in order to introduce competition in the provision of national long-distance services.

The first round of licensing of national long-distance services should be confined to those entities, public or private, which already have significant transmission and switching facilities and which are not already telecom service operators possessing market power. These enterprises should be qualified and then given time to create consortia to bid for a long-distance licence. Only if this round of licensing failed to produce one or more credible candidates for a licence should the Government of India adopt the second best solution of seeking a greenfield project to supply interstate long distance. This policy is intended to (1) speed up the introduction of services because the infrastructure is already partially in place; (2) increase the viability of public and private enterprises already committed to telecom to a greater or lesser extent; and (3) conserve infrastructure development capital.

Universal service in a competitive market

The contradiction at the heart of the Indian liberalization policy in general and telecom policy in particular is the absence of a programme of structural adjustment which comes to terms with the consequences of liberalization for the bureaucracy and public sector enterprises. In telecom, this takes, among other things, the particular form of the question of universal service in a competitive regime.

Traditional monopoly telecom is founded on regulated tariffs which cross-subsidize local services for rural and other higher cost, less wealthy constituencies. Competition drives costs toward prices and reduces the rents available to the erstwhile monopoly operator. The latter may find itself unable to cope with its obligation to provide service to non-economic customer segments, unless there is explicit provision for them in the government's policy.

The DoT, like incumbents everywhere, has made much of this issue. Its more or less obvious preoccupation is as much to slow or reverse the momentum of liberalization as it is to provide for less favoured customers. This does not make the issue less important. The problem is entirely typically accurate estimation of the cost of the service obligation. TRAI is aware of the issue and of the various means, which other geographically large countries such as the US, Canada, and Australia have adopted to deal with it.

India is not a country that can afford to ignore this question. If entrants in basic services (who are clearly not going to achieve their VPT [village public telephone programme] commitments) or in interstate long distance are to carry some part of the burden of the service obligation, they need to know this when they are planning their businesses. The sequencing of reforms at the microeconomic level has been far from optimal; action is required now in universal service funding mechanisms.

Fair competition: impeding restrictive trade practices and cartelization

The line between telecom regulation and enforcement of competition policy is always a difficult one for governments to draw. In most countries, the two functions are carried out by two separate agencies, with telecom operators subject to the jurisdiction of both. TRAI, in its latest paper on tariff consultation, concluded that it will have the entire responsibility for the telecom sector in India.

There are two sets of issues here. The first relates to anti-competitive collusion among telecom suppliers to maintain prices or terms and conditions less favourable to the consumer than they would be under fair market conditions. There have been scattered complaints of this from cellular consumers already, but it is difficult to make a convincing case that the current cellular price structure includes a premium due to collusion. The problems of the industry are more likely to be due to the underpricing of services by inexperienced management who do not understand their own cost structure, do not know how to compete except by cutting prices, and do not have a mandate to build value for the long term because their owners do not expect to be there for the long term. This is an area in where TRAI has already engaged itself.

The second set of issues relates to the fairness of competition between the public sector suppliers and the private sector licensees. In particular, these issues are raised by the intention of the MTNL to enter the cellular markets of Mumbai and Delhi. Assuming that the MTNL is to enter this market, who should decide the appropriate terms and conditions, and what should they be? While a public advisory role for the regulator is apt here, licensing should be transparent, but ultimately remains an appropriate prerogative of the executive. Unfortunately, the DoT is unable to assume this responsibility because it has been unable to overcome the conflict of interest inherent in its structure. In such circumstances, TRAI is the most obvious alternative and is best equipped to set the rules, which are to apply to the entry of a public sector supplier into a market served by private licensees. What should these rules be? There are some very important and useful precedents because the DoT is not the first incumbent to decide that it wants a share of the wireless revenues going to private companies.

The rules, which should apply to a wireless affiliate of an incumbent wireline company, as determined by the European Commission and Western telecom regulators, are as follows. The new wireless entrant must

- be operated as a second company, with an independent board of directors, specified independent audit standards, and an arm's length relationship with the incumbent
- pay the same licence fees and other public charges as the private licensees
- pay the same prices and observe the same terms and conditions for use of any facilities of the incumbent as are offered without discrimination to any private licensee, and avail itself of no other of the incumbent's facilities
- sell and price its services independently of the sale of the services of its wireline affiliate, as long as that wireline affiliate retains market power.

It is these terms and conditions that TRAI will want to consider when it evaluates the need for a level playing field raised by the potential entry of the MTNL into the cellular business.

Conclusion

TRAI has shown a very impressive performance under difficult circumstances, and the members and professional staff of the institution deserve the respect and thanks of those who believe that the addition of private capital and management may constitute a useful complement to the contribution of the public sector in the development of telecommunications in India. There is no need for further institutional reform if the process of liberalization of telecom in India is not to collapse under the weight of its internal contradictions. Pending that reform, TRAI will find itself, as other telecom regulators have found themselves, not only applying policy but also making it, often without much guidance from elected officials, who tend to be comfortable letting the independent quasi-judicial status of the regulator bear certain political costs. This is not always an entirely pleasant experience, but history elsewhere suggests that it can be an extremely valuable contribution to the economic and social welfare of the country.

Massachusetts Department of Telecommunications and Energy, Boston, USA

James Connelly

From monopoly to competitive market regulation: the Massachusetts experience

---

The laws of economics and technology are the same for every country. Moving from monopoly regulation to market regulation is not deregulation, but a different kind of regulation. In the Massachusetts DTE (Department of Telecommunications and Energy) in Boston also, there have been problems in the regulatory structure. In trying to move towards a market-based regulation, agencies that are staffed to do monopoly regulation – where people often cannot think outside of the monopoly – must change their way of looking at the industries that they regulate. The DTE in Massachusetts regulates telecommunications including cable television, the gas, electric, and water rates and services, transportation (rail, bus, and taxi), and pipeline safety.

The telephone industry is very well developed in Massachusetts, and the market in Boston that has developed in well over a hundred years is very saturated. For many years, telecommunications was largely a quiet area of regulation and not very dynamic. It was largely telephony and telegraphy earlier on – the transmission of intelligence by wire. The system worked very well, but it was evident that it was costly and that there were inefficiencies. A new model of performance-based rates for telephony under a price cap was considered a good way to start bringing competition into the telephone services in Massachusetts. This is how in 1995 a system called the Service Quality Index was set up to penalize as well as encourage the telephone company to do better. In Massachusetts, telecommunications regulation is an outgrowth of the common carrier law. Under the common carrier model the price cap was moved. Slowly it was recognized that compared to market effects (where they can be allowed to happen), regulation yields highly imperfect results. Empowering consumers with the choice of putting their money where they wanted and pitting one provider against another yields much better results. This does not however mean that regulation at some level is still not necessary.

Massachusetts operates under the umbrella of federal law and the constitution; and in case of a conflict, these two always triumph over the state law. The 1996 Federal Telecommunications Act was a major change in the way telecommunications was regulated. It is the objective of the DTE at the state level to create the conditions for competition within the local Bell Operating Company's service territory (Massachusetts). With local companies becoming a part of an even larger entity, regulation becomes even more difficult, but the DTE still has a say in what they do.

Massachusetts has telecommunications resale discounts at 29%, the deepest discounts in the country. In spite of this, there are many people who still do not find the discount attractive enough to enter resale of telecommunications from a local incumbent Bell company; they want to get into facilities-based competition and hence into unbundled network elements. Massachusetts is still wrestling with these problems. It has also done a number of arbitrated interconnection agreements.

Under Section 271 of the Telecommunications Act, companies have to prove that they have opened their markets sufficiently to the local competition in order to qualify to enter long-distance competition. So far around six filings have been presented by various states to the FCC (Federal Communications Commission) for approval, and each and every one of them has been disapproved. In some ways the 1996 Act has been disappointing. However, the pressure seems to be building up and in the next year or so there will be some real movement towards competition. The Act itself was highly compromised to get it through Congress three years ago. In a recent case, the majority opinion at the United States Supreme Court described it as anything but a model of clarity in terms of draughtsmanship. So legislative drafting problems are not really unique to India.

There is an interconnection between much of what is being done on the electric restructuring and the telecom sector even through it may not seem obvious at first. Throughout much of the US there is a convergence of utility businesses. Many electric companies have fibre optics systems to operate their distribution systems. The fibre optics system has a lot of excess capacity and many utilities have begun to realize how it can be used with the proliferation of a number of phone companies. Electricity distribution companies will be the only utility in any given geographic area that has a monopoly connection with each and every household and each and every business. Two utilities, Boston Edison and Massachusetts Electric, which is being bought by the National Grid Company, are setting up the fibre optics system to provide cable television service against the local incumbents who had a 25-year monopoly. Other uses for excess fibre optic capacity are Internet service, phone service, security alarm services, and, in one case, Boston Edison is getting into gas sales. This is an important area of convergence and it was hotly contested by the local incumbent cable monopolies. There has been a big trend in cellular telephones service too. It has become very controversial because it is tending to lead to great demand for new telephone numbers and new area codes.

Canadian Radio-television and Telecommunication Commission,
Ottawa,
Canada

Fred G Bigham

Tariff setting: a Canadian regulatory perspective

Transition to a liberalized environment: experiences and issues in regulation 365-366

Exhibit 1 *Setting tariffs (prices): some basics*

1 Marketplaces resolve three perpetual questions
  - What shall be produced?
  - How shall production be done?
  - For whom?

2 Marketplace structures vary
  - Perfect competition – 'price takers'
  - Imperfect competition
  - Workable competition
  - Monopoly – 'price makers'

3 Public utilities deemed for many years to be natural monopolies

4 Hence public regulation invented to ensure
  - just, reasonable rates
  - no undue discrimination

5 But, application of these 'standards' has changed through the years

Exhibit 2 *Conventional regulation*

Key factors	Standards
1 Aggregate price levels and profits	▪ Revenue requirement: operating cost + depreciation + income taxes + rate of return/rate base
2 Price structures	▪ Value of service ▪ Rate relationships ▪ Company-wide rate averaging ▪ Maximize long-run contribution ▪ Rate stability ▪ Recognition of costs
3 Social goals – service accessibility	▪ 'Acceptable' cross-subsidization among subscribers

Essentially, balancing of interests of subscribers, shareholders, and 'public policy' goals

Exhibit 3 *Competition emerges and new issues surface*

1. Cross-subsidization from users of monopoly services tc 'support' competitive market
2. More specific concern that 'bottleneck' facilities required by competitors priced in predatory fashion
3. Inherent cross-subsidies to meet policy goals – who pays now? How?

Exhibit 4 *Revised regulation*

Key factors	Standards
1 Aggregate price levels and profits	▪ Introduce split rate base ▪ Competitive segments • market by market forbearance • no price or profit regulation ▪ Utility segment • price caps with sub-baskets • no profit regulation but productivity factor in formula
2 Price structures	▪ Competitive segment • forbearance ▪ Utility segment • flexibility subject to sub-basket thresholds
3 Social goals	▪ 'Contribution' framework with central fund agreement

Essentially, balancing interests of subscribers, shareholders, new competitors, and 'public policy' goals

Canadian Radio-
television and
Telecommunication
Commission,
Ottawa,
Canada

Dave Lindsay

Tariff setting and cost separations: a company's point of view

Exhibit 1 *Why come to the party*

1 Cost separations are difficult
2 Become public information if used for regulatory purposes
3 Provide competitors with intelligence about your business
4 Probably does the company more good than harm

Exhibit 2 *Market cross-subsidies*

1 Technologies have freed most markets
2 Competitors will be in these markets
3 Different competitors in each market
4 Strategies dictate that prices must approach costs in all sectors
5 Separations allow you to determine costs by segments and measure strategic impacts
6 Recognizes the cost of policy decisions

Exhibit 3 *Pricing in competitive markets*

1 The correct rate is important – too high and competition is impeded; too low and inefficient operators are allowed to enter
2 The regulator will be encouraged to set rates too low if information is absent
3 Recovery of all costs is the objective

Exhibit 4 *The key objectives*

1 Competitors will serve profitable markets first
2 These markets fund politically-driven objectives
3 Ensure the cost of entry considers the impact on the strategic goals of the country
4 Avoid sudden shocks to the systems

Department of Telecommunications, New Delhi

S P Purwar

Tariff setting

Transition to a liberalized environment: experiences and issues in regulation 368-371

Telecommunications is an important infrastructure input for the economic development of the country. Till recently, this sector was the virtual monopoly of the government. However, after the National Telecom Policy, 1994 came into effect, companies registered in India have been permitted to operate in basic telephony and value-added services. In the changed scenario, it is imperative to protect the interest of the consumers and to ensure fair competition. In both respects, tariffs would play a key role.

With the emergence of competition in the telecommunications market all over the world, the situation is rapidly changing. In a competitive market, cross-subsidization of services is bound to be unviable and in the long run, prices have to approximate cost. Nearly every telecom administration is, therefore, addressing the real costs of operation. For example, it has been a feature of the telecom industries that rental (the price of access) and local call charges (the price of usage of the local network) have generally been subsidized by the long-distance service. With the emergence of competition in the long-distance market, prices of long-distance calls have fallen dramatically in many countries while prices for use of local systems have been suitably rebalanced. Costs have, therefore, become major drivers in the telecommunications markets of today.

Objectives of tariff setting

The objectives of tariff setting depend on the stage of telecom development and government policies. The main objectives of tariff in the telecom service in India under the monopoly environment were to

- provide affordable service of reasonable quality to consumers
- use tariff as a tool for mobilization of sufficient internal resources in order to expand and develop the telecom network in the country
- provide concessional tariff to certain segments of society, thus making telephone services accountable to them (e.g., rural subscribers).

Telecom Regulatory Authority of India

Section 11(2) of the TRAI (Telecom Regulatory Authority of India) Act vests TRAI with powers to fix tariffs for telecom services. In conformity with this, TRAI brought out the Consultation Paper on Pricing of Telecom Services. It has asked for comments from service providers, consumer organizations, and others including the DoT (Department of Telecommunications), and organized open-house sessions in various parts of the country to get feedback on its paper. This exercise is expected to take final shape shortly.

Concepts and principle of tariff setting

The concepts and principle for tariff setting cannot be seen in isolation. It depends on various factors such as the stage of development of the telecom sector of a country and the nature of the environment, that is, monopoly or competition, extent of tele-density or tele-penetration, USO (universal service obligations), etc.

Most developed countries use the concept of LRIC (long-run incremental cost) for setting the tariff of telecom services. In India, the concept used is fully allocated based on historical cost for pricing telecom services.

The difference in methodology is primarily due to the different stage of telecom development. In India, tele-density is as low as 2 per 100 and substantial resources are required for making telephones available on demand and fulfilling social obligations. In developed countries tele-density is high, the written-down value of their assets is almost zero, no major investment in expansion of the telecom network is required, and there are hardly any social obligations to fulfil. These countries have reached the stage of cost-based tariff. However, in India, the route to cost-based tariff will take time because of the inbuilt subsidy and the need to fulfil social obligations.

Procedure for determining tariff

The present tariff structure of the DoT is not entirely cost-based and cross-subsidization does exist. The government's socio-economic policies and fulfilment of USO are the major determinants of rates for different categories of consumers and services. On the whole, telephone tariffs are enhanced so as to ensure a reasonable rate of return on the capital employed by the DoT and to ensure sufficiency.

Presently, cost-accounting data are not in place to enable identification of cost on marginal/incremental cost bases. Nor has it been possible to have disaggregated costs on a regional basis. There is a large difference in productivity on various routes and some routes are even operating at a loss.

Furthermore, by the very nature of the sector, there are joint/ common costs, which can only be distributed by way of allocation over different service segments.

The existing procedure is to calculate the cost of switching and transmission using a fully allocated method on historical cost basis. After arriving at the cost, some percentage of annual recurring expenditure is taken to arrive at the rental and usage charges. Subsequently, based on the objective, rental and usage charges are fixed in a manner such that the DoT gets sufficient funds for expansion and upgradation of the telecom network.

In our existing tariff structure, rentals and local call charges are underpriced and long-distance call charges are overpriced. Underpricing of the rental leads to excess demand for access and over-pricing of long distance calls has not led to measurably low usage. Striking a balance between accessibility and usage depends on the objectives of tariff setting. In India, the objective so far has been to cross-subsidize from long-distance charges to rental and local call charges. The charges of long-distance calls have been kept deliberately higher for the purpose of generating sufficient investable surplus for further development of the network.

Interconnection charges

Interconnection is the physical connection between two networks and it facilitates subscribers of one operator's network to communicate with subscribers of another network. It is vital for effective communications and promotes accessibility among a wider subscriber base. A reasonable interconnect agreement and, in particular, interconnecting charges are very important for fair competition in a competitive environment.

The charges in interconnect agreement are listed below.

- *Cost of link between the networks* – New entrant to bear the cost either on R&G or contribution basis.
- *Port charges* – The licensee has the option to take it either on graded scale or flat-rate basis. This arrangement is for a period of three years, after which the DoT will provide interconnection on full-cost basis, subject to any decision or direction of TRAI on this subject.
- *Access charges* – Basic telephony
  - Local call – bill and keep system
  - STD/ISD – The receiving network will get Re 0.50 and Re 0.70 per unit for STD and ISD calls, respectively, from the originating network.

Cost-based tariff

In a monopolistic environment, the element of subsidy is inbuilt in the tariff structure. This leads to distortion in pricing of various elements of the telephone services. Such aberrations may be allowed to continue in a monopolistic environment; however, with competition set in motion, cost-based tariff will be the norm rather than the exception. But the movement towards cost-based tariff should be such that the existing revenue of the DoT should not be destabilized because this would affect the growth of tele-density and accessibility in the country. In other words, the pace towards cost-based tariff should be based on the needs and requirements of the country. The following are some of the drivers of cost-based tariffs in a competitive environment.

- Market liberalization
- Globalization
- Better technologies
- Regulatory presence
- Increased competition

In future, the tariff of various services will depend upon the scientific methodology for conducting a cost-based study, allocation of common cost and demarcation of various services in terms of cost provided on the same network. These studies will help in developing flexibility and a transparent tariff structure.

Unbundling of cost/cross-subsidization

In a monopolistic environment, the costing methodology does not take into account the unbundling of cost. Also, the element of cross-subsidization is inbuilt in the tariff structure. At this stage, it is not possible to quantify the extent of subsidy due to non-availability of data. However, unbundling of cost in the telecommunication sector presupposes advanced accounting system to the needs of costing of telecom services. Another difficulty of unbundling of cost is the apportionment of cost to each service in the telecom sector due to common or joint costs. In a competitive environment where tariff will be the cutting edge, it will be imperative to go for unbundling of cost in order to find out the cost and revenue of each stream of the telecom services. Cross-subsidization will also have to be transparent with a reasonable degree of accuracy to ascertain the extent.

Telecom Regulatory Authority of India, New Delhi

Harsha Vardhana Singh

Tariff policy: some considerations

Transition to a liberalized environment: experiences and issues in regulation 372-373

Tariff policy has always been basically a decision about balancing the interests of customers and service providers. Over time, the instruments required to ensure balance among these interests changed as the telecom market became more contestable. The emphasis now is on achieving the gains for both customers and service providers that arise through improvements in efficiency in a competitive situation.

Interconnection

Interconnection implies a need to create adequate conditions for participation in the market by multiple service providers, including through fixing appropriate interconnection charges. A crucial principle regarding interconnection charges is that they should not act as barriers to competition. Therefore, they should not discriminate between one's own and another service provider's operations. An important way of avoiding this distinction is to base interconnection charges on the costs of providing interconnection. Therefore, cost-based pricing is a must for interconnection charges.

Interconnection charges also feed into the prices charged to subscribers, through a system of access charges that operators in the network pay to those operators whose network is used for providing a particular service. Determination of such access charges, together with customer tariffs, will become essential, e.g., when long-distance transmission is liberalized in India. This requires information about costs at a considerable level of detail, thus involving unbundling of costs. Unbundling of costs is also required to ensure 'fair competition' when service providers are in the market for more than one type of service, e.g., cellular mobile and basic fixed line services.

Access to the network by subscribers

A very important consideration in tariff policy is network externalities, including those reflecting the social concerns for providing telecommunication services as widely as possible. This implies that tariffs for access of the subscriber to the network should be below costs. This involves a separate emphasis on determining the tariff for customer's access to the network.

Since a larger number of customers reduce the average cost in a fixed cost environment (such as telecom), access price assumes even greater importance. Thus, it cannot be determined only in terms of simple costing principles. Demand becomes an important consideration in this context. There has to be a balance between affordability and below-cost pricing for access (or rentals, as they are commonly termed). However, with below-cost rentals (and this itself is not an easy concept), cross-subsidy has to be provided by other tariffs, namely by tariffs for usage of different services. These tariffs, therefore, have to be above cost.

Subscribers using services which have above-cost tariffs will attract the attention of competing service providers because these subscribers will provide high revenues and profits. To the extent that these subscribers provide a major portion of revenue, the situation becomes vulnerable for those providing services to other subscribers. An example of this is the present situation of the Department of Telecommunications.

To sustain profitability and maintain the subscriber base of those who do not use high-priced services (and these are at present the large majority in India), there is a need to limit both the excess of any tariff over cost as well as the extent to which tariffs are below cost. This involves a correction in tariffs moving towards costs, which has been termed as re-balancing. Like interconnection charges, such re-balancing is a prerequisite for creating and sustaining competition.

Limits to regulation

In the rapidly changing world of telecom, new services (including flexible combinations of available services) are being offered to attract customers.

Once the basic regulatory framework has been provided to facilitate the provision of services, the role of the regulator should be to ensure that the basic objectives of customer protection and competition among service providers are achieved. This may not require tariff intervention in each and every type of service. Thus, clear principles should be enunciated about when regulators should intervene with regard to tariffs.

More and more, as the market provides the 'regulatory pressures' and as new services emerge which are not linked to the basic social objective of providing access to specified services, it need not be necessary to regulate several tariffs. Forbearance becomes an attractive and reasonable regulatory option in this situation. Qualified forbearance is also possible if the regulator ensures certain ceilings or certain price packages mandatorily to be offered to subscribers, leaving the service provider with the freedom to provide, on a voluntary basis, any other price package. Demand-side pricing is the underlying principle with forbearance.

Escotel Mobile,
New Delhi
K Vijay Rao

Impact of the new telecom policy

Transition to a liberalized environment: experiences and issues in regulation 374-379

Exhibit 1 *Opportunities arising from the New Telecom Policy 1999 objectives*

Policy target	Up to 2002	2000-05	2005-10	Remarks
	(Investments required to meet objectives) (billion rupees)			
Rural				
1 Access to all citizens, connectivity	12			Conventional roll out
2 To all villages covering 260 000 villages	13			Using satellite
3 Increase tele-density to 4 by 2010			130	
4 Upgrade PCOs to be ISDN terminals				
Urban				
1 Upgrade existing economic centres to world standards and grow at 10% per annum	300			
2 Increase tele-density to 7		2000		
3 Increase tele-density to 15			3200	
International market opportunities (in billion US$)				
Make India IT superpower				
1 Software exports	50	100	200	
2 Other telecom related services	75	150	100	

IT: information technology; PCOs: public call offices; ISDN: Integrated Services Digital Network

Make telecom a national mission

Exhibit 2 *The threshold curve*

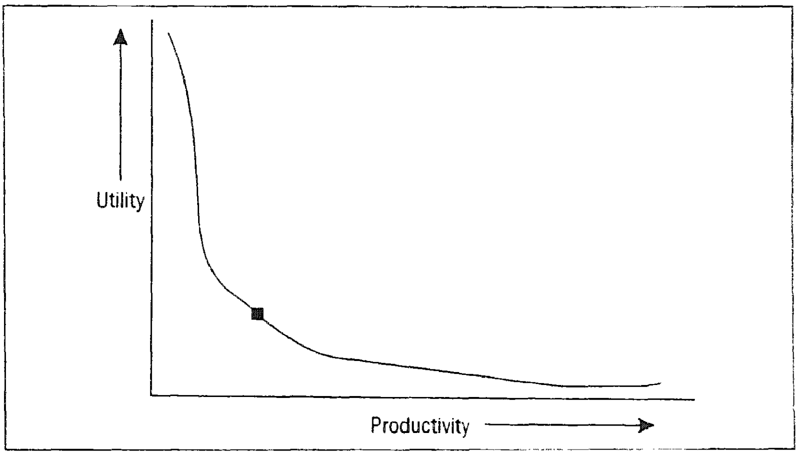


Exhibit 3 *Gaps in investors confidence*

Policy framework	Earlier policy	Present policy
1 Clarity – objectives	No	Yes
2 Consistency	No	No
3 Transparency / level playing field	No	Yes
4 Long-term validity	No	?
5 Flexibility – technical obsolescence	No	Partial
6 Market viability	No	No
7 Enable smooth implementation	No	No

India needs investments to build world class telecom infrastructure

Exhibit 4 *Gaps in the new policy*

1 Underestimates the 'viability' issue
2 Long distance revenue and sharing
3 Resolution of existing operators
4 Issue of overcrowding and migration plan/guidelines
5 Policies regulating arm's length operations
6 Silence on local implementation issues
7 Monitoring mechanisms and penalties

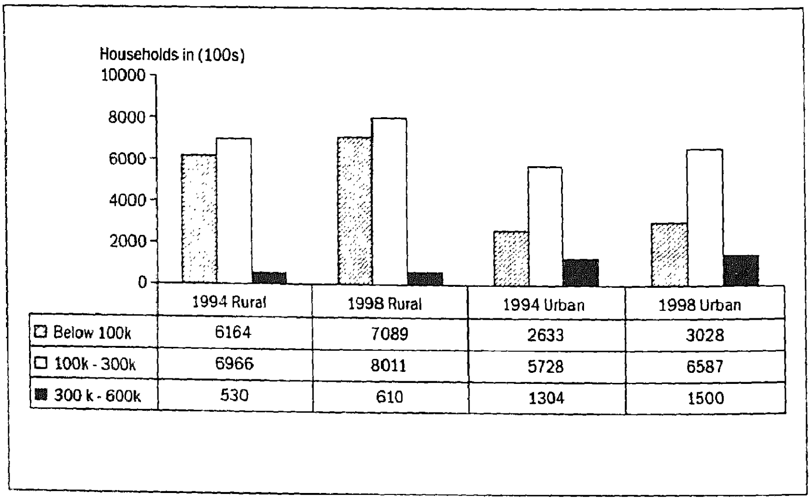
Sustainable model only at international norms

Exhibit 5 *International comparison – cellular tariffs*

Group	Connection charge ($)	Monthly charge($)	Cost of 3 min. call ($)
Africa	217.4	42.4	1.9
Americas	101.8	35.0	1.4
Asia	119.1	30.2	0.6
Europe	97.4	30.6	1.3
Oceania	63.2	28.6	1.1
World	217.4	42.4	1.9
India	33.8	4.4	0.7

Source ITU World Development Report, 1997

Exhibit 6 *Households in different categories*



	1994 Rural	1998 Rural	1994 Urban	1998 Urban
▨ Below 100k	6164	7089	2633	3028
☐ 100k - 300k	6966	8011	5728	6587
■ 300 k - 600k	530	610	1304	1500

Source National Council of Applied Economic Research

Exhibit 7 *Creating indigenous equipment and R&D development environment*

1 Strategic importance
2 Link technology inflows with imports / foreign direct investment
3 Provide level playing field – NTF part II recommendations
4 Cess on telecom – build R&D/exports
5 Timing critical

Critical to have a strong indigenous industry

Exhibit 8 *What next?*

1 Developing models to arrive at
  - percentage revenue sharing
  - entry fee
2 Defining migration path
3 Strategy note on market generation for viability
4 Drive penal deterrents for critical formations

Need for integrated strategic time-bound plan to make India IT superpower in the new millennium

Exhibit 9 *Areas to watch for*

1 Overemphasis on competition
2 Conflicting priorities
3 Planning without political debate
4 Overloading the regulator

Exhibit 10 *Challenges in leveraging the opportunities*

1 Indian telecom infrastructure is inadequate
2 Indian telecom tariffs are ten times more expensive
3 Unreliable
4 Cost more to host sites in India
5 Poor infrastructure

Exhibit 11 *Quality*

Quality is a function of

1 Customer requirements and affordability
2 Technical standards, processes, and management
3 Management philosophy and commitment
4 Environment and quality of human resources

Exhibit 12 *Requirements of the Telecom Regulatory Authority of Ina*

1 Technical	Dial tone <600 MS for 95% calls
2 Customer facilities	Billing facility within 2 km Less than 18 complaints/month Billing <1% complaints Directory updating every year Operators to respond within 10 seconds
3 Requires developmental statistics	149 + parameters Operational, quality of connection, grade of service, operator services/assistance
4 Quality assessment surveys	

Exhibit 13 *Areas of concern*

1 Over regulation
2 Small value fines
3 Standards should be measurable
4 Need for changing parameter requirements
5 Information authenticity and leakage
6 Environmental factors' vulnerability to establish legal culprits
7 Affordability of providing services

Exhibit 14 *Suggestions*

1 Leave market to decide quality
2 Provide major deterrent for continued faults, if proved
3 Focus on identifying strategies to improve environment/ value systems
4 Address viability issue
5 Political and administrative commitment – all levels
6 Mitigate local harassment
   - empower special secretary
   - problem resolution within two to seven days
7 Revise financial norms

ESSAR Comvission, New Delhi

Hemant Luthra

Current scenario and recommendations for the future

Transition to a liberalized environment: experiences and issues in regulation 380-392

Exhibit 1 *Current scenario*

1 National Telecom Policy, 1994
  - Telephone on demand
  - Provision of world-class service
  - India to emerge as manufacturing/export base
  - USO (universal service obligation)

2 Telecom sector's key dilemma: financial closure
  - Market size and growth are small compared to bid assumptions
  - High licence fee forces companies to increase project size unrealistically and aggressively to demonstrate revenues for payment of licence fees
  - Financial institutions are
    - unwilling to finance unproductive project costs – the licence fee
    - concerned about long gestation and break-even periods
  - Vendors are willing to finance project's equipment portion
  - Higher baseline capital equipment cost due to customs duty, financing costs
  - Multiplicity of approvals (from the Ministry of Environment and Forests, the Ministry of Surface Transport, the Standing Advisory Committee on Frequency Allocation, the Wireless Planning and Coordination Wing of the Ministry of Communications, etc.) leads to delay in project take-off

3 Anatomy of failure
  - Validity of the privatization model
  - Hype and the herd instinct, scramble for the new eldorado
  - Revenues from licences treated as a means to finance the deficit
  - Underestimated depth of commitment required
  - Absence of a regulator
  - Absence of supporting capital marketing infrastructure

Exhibit 2 *The promised land: New Telecom Policy 1999*

1 Convergence of markets and technologies
    - telephony and broadcasting
    - wireline and wireless
2 Need to create a modern infrastructure
3 IT (information technology) superpower
4 IT could be to India what oil has been to the Middle East

Exhibit 3 *Drivers of the new policy*

1 Rapid technology obsolescence and unstoppable nature of technology erodes traditional telecom model
2 Original licence fee bid based on traditional model
    - local loop is an invaluable asset as services to end-user have to flow through local loop
3 New Internet policy erodes
    - the traditional telecom model
    - cuts significantly into telecom revenue streams
4 Convergence enables multiple service providers to cannibalize on basic service provides' primary revenue streams
    - Internet telephony is viable and no policing is possible
    - last mile access to ISPs (Internet service providers)/ CATV (cable TV) significantly cuts into 'connect time' revenues of telecom
    - technology available for telephony on CATV networks

Exhibit 4 *The promise and failure*

1 Task force to rescue all outstanding issues and submit report by 30 November 1999, Government of India to act by 31 December 1999
2 Accord priority to outstanding issues, set the direction for the future
3 Uncertainty has wasted 24 months of effort
4 Convergence addresses the needs of 0.1% population, cannibalizes basic service providers' assumed revenue stream
5 Cherry picking and quality of service
6 Unanswered questions – Draft of New Telecom Policy 1999
  - convergence
  - degree of revenue sharing?
  - cellular? WLL (wireless in local loop)? Wireline?
  - foreign operator
  - 1800 GSM (global system for mobile communication) / 800 CDMA (code division multiple access) / 900 GSM

Exhibit 5 *Case study: Punjab*

1 Essar, Alcatel, Qualcomm, Worldtel, Airtel – agreed to revise equity from 200 million dollars to 300 million dollars for funding basic service
2 Qualcomm, Alcatel agreed to fund vendor debt
3 Solution found for sanctions issue
4 Ministry of Surface Transport refuses permission to dig
5 Duty structure on NIU 20%–58%
6 ISP licences given – VoIP (voice over Internet protocol), Last Mile Link, impact on revenue

Exhibit 6 *Dangers of current situation*

1 Ouster of Indian companies from the Indian telecom scene
  - large project outlays lead to need for greater foreign equity participation if debt options are limited; higher dependence on costly technologies preferred by foreign partners; long gestation periods
  - Indian companies' resources versus that of multinational companies'
  - in the long run, greater foreign stake will ease out or jeopardize the Indian stake

2 High project costs and high licence fees result in higher cost to consumer

3 Unattractive private projects will put the entire burden of providing basic telephony on the DoT (Department of Telecommunications)

4 Total outcome
  - low telecommunications penetration
  - no revenues to government from private sector projects
  - companies pushed into bankruptcy

5 An industry that can channel 80 billion dollars / foreign direct investment fails to live up to its potential

Exhibit 7 *Regulatory imperative*

1 Strengthen TRAI (Telecom Regulatory Authority of India) – power to recommend/enforce licence
2 Liberalize financial options
3 Ensure consistency between different arms of government
4 Legal options available

Exhibit 8 *Strengthening the Telecom Regulatory Authority of India*

1 The Draft Telecom Policy does not address critical role of regulator despite the Prime Minister's commitment on 24 October 1998

2 It has conspicuously failed to appreciate and record the need for an independent and empowered regulator to facilitate huge investments

3 It undermines TRAI's role by restricting its involvement to dispute settlement

4 Suitable amendment to the TRAI Act by ordinance to be implemented, effective 31 March 1999 and to cover following issues
    - TRAI to adjudicate dispute settlements between all service providers (including DoT/MTNL) and licensor
    - TRAI powers, including recommendatory powers, to apply to all existing and future service providers (including DoT/MTNL)
    - TRAI to recommend entry of third operator – MTNL/DoT – into cellular services
    - TRAI to play significant role in determining market structure and number of players
    - TRAI to determine timing, quantum of entry fee and revenue share payable by DoT/MTNL as third operator
    - TRAI to also judge whether it is necessary to over-regulate the incumbent operator (as in most other regimes) to ensure that a level playing field is created

Exhibit 9 *The licensing regime: some suggestions for implementation methodology*

1 Licensing agencies
  - either a separate independent licensing cell in the DoT or a licensing cell under the purview of the Ministry of Communications
  - TRAI to transparently determine the timing and entry of new licensees taking account of various factors including
    - current and future demand projections
    - efficient allocation of resources
    - availability of funds for India's telecom industry
    - maintaining telecom's attractiveness to investors – now and in the future

2 The entry fee
  - initial entry fee to serve as
    - deterrent for entry by frivolous entrants
    - signature or commitment fee to demonstrate licensee's seriousness to pursue project

Exhibit 10 *Terms and conditions for new entrants: some suggestions*

1 Quantum of entry free: the initial entry fee to be high enough to ensure
  - adequate deterrence to frivolous entrants
  - gradual liberalization to suit the growth of market and increase in tele-density
  - consumers benefit from economies of scale and scope
  - certainty of market structure for financiers who are funding the project
  - market remains attractive to investors

2 Checks and balances: licensing cell or TRAI to ensure achievement of specified performance parameters
  - roll-out – number and physical coverage
  - price – of services and range of services
  - quality of service – against specified standards
  - penalties – for non-performance including termination of licence

Exhibit 11 *A rational licensing model for India: the Singapore moc*

1 No weightage is given to licence fee in tender evaluation process

2 Successful bidder pays initial one-time entry fee of 10 million dollars

3 Annual recurrent fee of audited turnover subject to minimum of 1 million dollars (in year one, 2 million dollars in year two, 3 million dollars in year three, similar to the India metro model)

4 Weightage for winning tender

▪ strategic plan	7.5%
▪ business plans	12.5%
▪ effective roll-out plan	30%
▪ technical support	10%
▪ relevant experience	10%

5 Advantages for Indian tender process
- linkage to real, not projected, future earnings
- no pre-specified percentage revenue bid but specified by government based on revenue potential, demand expectations, etc.
- prevent overbidding of licence fee / revenue share since selection is based on non-financial parameters
- no linkage to reserve price / net present value
- no relation to net worth

Exhibit 12 *Governments correlate market size and level of competition: international precedents*

Country	Structure	Result
Indonesia	Incumbent national (Telekom) and international (Indosat) partially privatized in 1994 and 1995; five regional joint operating monopolies - one per region - to expand local network	As of 1997, Indonesia was the third largest growing network in the Asia-Pacific region 'Indonesia's managed approach to telecommunications reform has resulted in fewer regulatory problems and delays than other countries' (ITU 1997)
Malaysia	Too many licences issued - six fixed, six mobile, five providing international gateways	Government called for industry consolidation to ▪ minimize duplication of resources and excess capacity ▪ optimize network utilization ▪ reduce foreign exchange losses 'We do not believe the local telecom market can support all the existing operators...As such, we believe that a shake-up is inevitable and necessary before the industry stabilizes' (UBS 1997)
Australia	Duopoly established until July 1997 to allow Optus, competing carrier, to build market share and experience before entry of new operators; Austel, the regulatory body, allowed required time to build up regulatory expertise	Incumbent operator, Telstra, reported highest ever profits in 1996 despite four to five years of competition and revenues grew by over 25% since competition introduced despite shared market with new entrant
New Zealand	Small market size led to limited entry; duopoly structure despite open competition policy	Incumbent operator, Telecom New Zealand, reported highest ever profits in 1996 despite four to five years of competition and revenues grew by over 25% since competition introduced despite shared market with new entrant

Exhibit 13 *Merits of the managed transition model*

1. Brings significant advantages to government, private sector, and consumers
2. Higher public firm valuation - governments receive larger revenues from sale of shares of corporatized firms
3. The DoT will maintain significant market share and revenue base
4. Early positive cash flows brings early revenue share to government
5. High entry free satisfies government's immediate revenue concerns
6. Quicker potential returns makes markets more attractive to potential investors
7. Companies can achieve greater economies of scale and scope
8. Reduced network costs translated into lower prices for consumers
9. Companies' access to capital improves
10. Efficient allocation of scarce funds for which there is competition in the global market
11. Realistic and robust business plans result in financial closure and improved project viability

Exhibit 14 *Free for all regime: pitfalls*

1. Ineffective utilization of resources
2. Firms will be forced to price their services higher and this will lead to contracted market
3. Many players in the market will lead to
    - reduced market share
    - cut-throat competition
    - bankruptcies
    - wasted networks
4. Excessive licensing is viewed as a significant problem for the regulator in newly liberalizing markets (ITU 1997) (e.g., Australia, The Philippines, Bangladesh, Malaysia)
5. Excessive licensing in various developing countries has led to significant
    - funding and financial difficulties
    - poor service to customers (Lehman Brothers 1998)

Exhibit 15 *Financial options – I*

1 Conservative debt:equity norms
2 Existing licence fees
3 Access to Indian capital markets
4 Limited hedging options and basket of instruments

⇓

Foreign dominance over telecom business

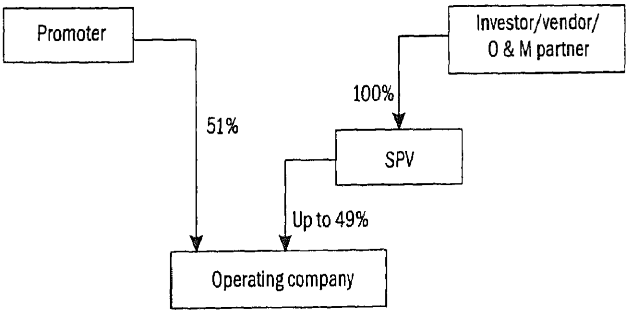
Exhibit 16 *Financial options – II*

1 Access to high yield debt
  - 5 + 7 years
  - interest not payable in 0–5 years
  - refinancing allowed at premium
  - redemption through IPO (initial public offering)
2 Enhance upside through warrants
3 Hedge through options

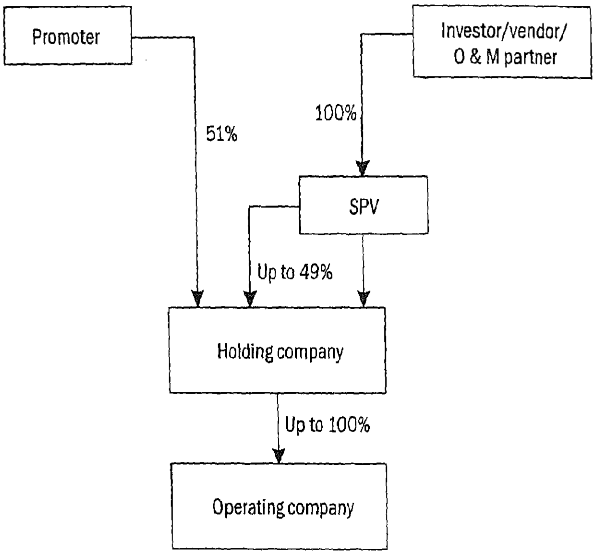
Exhibit 17 *Instrument: equity*

Structure

1 Direct equity through an SPV (special purpose vehicle) overseas. Equity is invested by vendors, strategic investors, and operating partner
  - Security
    - Normally unsecured. However, there are restrictive covenants for management of the company
    - Put option to offload the equity back to promoters or sell it back to the operating company after company achieves certain milestones.
    - Right to take the company public



2 Through multiple holding companies (from vendors, strategic investors, and operating partner)



3 Through loan support to the holding company (equity support). This loan is normally for a period of five years so as to take care of the construction period of the project

- Security through a guarantee by the promoters and a legal pledge of shares bought out of the loan

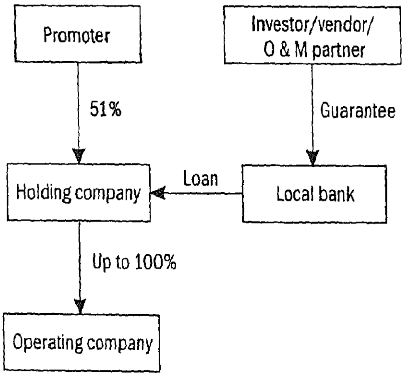


Exhibit 18 *Other instruments*

Instrument	Structure	Security
Senior debt from FIs (financial institutions)	A long-term facility (10-12 years), with moratorium on interest and principal repayment for about five years to take care of the cash deficit and capex requirement during the construction phase	Pari passu charge with all other senior lenders on all assets and a legal pledge of 51% shares and also the assignment of licence wherever applicable. This is without recourse to the sponsors; contingent equity to cover revenue deficits and project cost overruns
Subordinated debt	A long-term debt (10-12 years) with higher coupon rate than the senior debt	The same as that of senior debt; however, the servicing of the debt is after the servicing of the senior debt
Structured guarantee	Guarantee by the FIs for the servicing of the debt. The debt is to be raised against this guarantee from various domestic banks and institutions	Same as that for senior debt
High-yield bonds	Senior secured notes with maturity of 10-12 years; interest payment in kind for four to five years if the project cash flows do not permit such payments in the initial years; call option with issuer for replacement of high-yield debt with cheaper finance; warrants to give right to buy equity shares in the company	The security is same as that for senior debt with certain privileges and options to the bond holders; equity call-back
Cumulative exchangeable preferred stock	The dividend on these shares accumulates or is paid in kind through issuance of more stock	Same as previous one with same redemption privileges and put rights

Exhibit 19 *A different approach*

1 Business layer
2 Service layer
3 Network layer
4 Network element layer

References

ITU. 1997
Asia-Pacific Telecommunication Indicators: New Telecommunications Operators
p. 55.

UBS. 1997
Asian Telecommunications Focus: Tied in Knots
September 1997. p. 39.

Lehman Brothers. 1998
Indian Cellular: Overview of the Sector
6 March 1998

Sterling Cellular Ltd,
New Delhi

Eric Buerkler

Microeconomic analysis of Indian market conditions

Transition to a liberalized environment: experiences and issues in regulation 393-394

Exhibit 1 *Today's main focus*

1. Factor cost advantage
2. Natural resources advantages
3. Price competition
4. Focus on market share not market growth
5. Short-term view
   - high uncertainty (politics)
   - high interest rates
6. Mainly rent instead of efficiency seeking

Exhibit 2 *Tomorrow's regulation*

1. Stress on soft assets and quality infrastructure and strong institutions
2. Shift from access to conduct regulation
3. Position operators as facilitators instead of cash cow (license conditions)

Exhibit 3 *Future business in India*

1. Strategy of making choices instead of opportunism
2. Focus on strength and differentiation
3. Asset building instead of trading
4. From capex and working capital to brand and product/process investment
5. Outpace competition on cost and differentiation with good segmentation

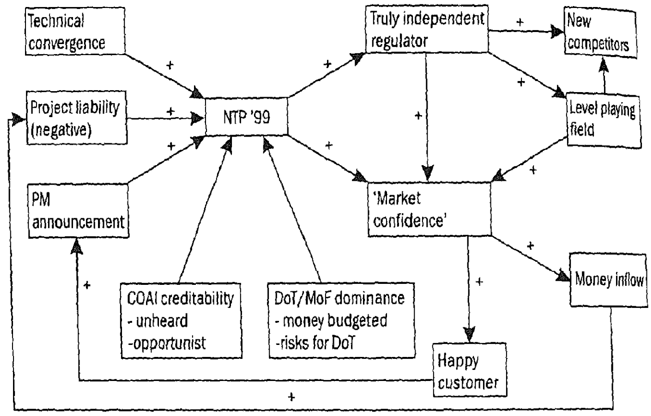


Figure 1 New Telecom Policy 1999: factors
Note COAI - Cellular Operators Association of India; DoT - Department of Telecommunications; MoF - Ministry of Finance; NTP'99 - New Telecom Policy 1999

Australian Competition and Consumer Commission, Dickson ACT, Australia

Allan Asher

The Australian Competition and Consumer Commission in the open competitive telecommunications market

Transition to a liberalized environment: experiences and issues in regulation 395-408

Introduction

The ACCC (Australian Competition and Consumer Commission) assumed the primary role for competition and economic regulation in telecommunications markets from 1 July 1997.

The ACCC's responsibilities are primarily centred on enhanced competition powers under Part XIB of the Trade Practices Act, and access regime under Part XIC of the Act.

The ACCC ensures competition in telecommunications by (1) outlining the commission's powers and functions relating to telecommunications; (2) describing the commission's approach to administering competition and access issues with reference to recent and ongoing matters; and (3) noting the continuing need for self-regulation of the industry if the full benefits of open competition are to be achieved.

Part XIB: competition/ conduct provisions

Under Section 151AK of the TPA (Trade Practices Act) 1974, carriers and carriage service providers are prohibited from engaging in anti-competitive conduct. This prohibition is known as the competition rule. There are two circumstances in which a carrier or carriage service provider is said to engage in anti-competitive conduct

1. where a carrier or service provider with a substantial degree of power in a telecommunications market takes advantage of the power with the effect or likely effect of substantially lessening competition in that or any other telecommunications market (Section 151AJ[2])
2. where it engages in conduct in contravention of sections 45, 45B, 46, 47, or 48 of the TPA and the conduct relates to a telecommunications market (Section 151AJ[3]).

If the ACCC determines that a specified carrier or carriage service provider has contravened the competition rule, it may issue a competition notice. The ACCC may also, without issuing a competition notice, seek injunctions in the Federal Court in relation to conduct what constitutes or would constitute a breach of the competition rule (Section 151AC[1]) of the TPA.

Issue of a competition notice

In deciding whether to issue a competition notice, the ACCC must refer to the guidelines for issuing competition notice, which it produced in June 1997 after discussion with the industry. In addition to the guidelines, which list discretionary matters, the ACCC must take into account the draft information paper it has released, entitled 'Anti-competitive Conduct in Telecommunications Markets'. This paper is designed to inform the industry of the approach that the ACCC will usually take in analysing allegations of anti-competitive conduct in telecommunications markets. The ACCC has been considering the views of the industry and others, and will shortly issue a further version of this document.

Significant consequences arise from the issue of a competition notice. The legislation provides that a competition notice will be taken as prima facie evidence of the matters in the notice. If the Federal Court is satisfied that a person has contravened the competition rule, it may make orders including pecuniary penalties up to 10 million dollars[1] in fines plus 1 million dollars per day for continuing breaches following the issue of the competition notice. In addition, once a notice has been issued, private parties may seek injunctions, damages, information disclosure, or corrective advertising for breaches of the competition rule.

Initiating investigations: the ACCC's approach

The ACCC commences an investigation into potentially anti-competitive conduct (or monitors conduct which is, for example, inherently capable of being anti-competitive) whenever the commission considers such action to be in keeping with the Act's objective of enhancing the welfare of Australians through the promotion of competition and fair trading and provision of consumer protection. For example, the ACCC may commence an investigation under a number of circumstances including

- following a complaint by any person
- where indicated by matters arising from an investigation of any person (including a carrier or carriage service provider) as part of the ACCC's performance of its duties (e.g., in response to information obtained in the process of administering, information-gathering provisions such as tariff-filing directions or record-keeping rules)
- where the ACCC obtains information which suggests that a contravention of the competition rule may have occurred, or is occurring by other means (e.g., media reports).

---

[1] Dollars in this paper refer to Australian dollars.

The ACCC seeks to monitor developments in the industry to assess the need for intervention under Parts XIB and XIC, as well as other provisions of the TPA. However, that should not be at the expense of an active role by the industry in the development of a progressive telecommunications market in which competitive forces drive innovation, investment, and provision of quality services.

The ACCC's experience in applying Part XIB

The ACCC has investigated a number of matters under Part XIB of the TPA. In all of these matters, the commission has found that it had (or currently has) a reason to suspect that contravention of the competition rule has occurred. However, to date, in none of these matters after full investigation has the ACCC determined that there was a contravention of the Act. Without a contravention of the Act, the ACCC does not even get to the discretionary step of deciding whether to issue a competition notice.

Perceptions apparently held by industry that the ACCC is being cautious in using the competition notice power or that it will only issue a notice when it has a cast-iron case maybe understandable, but are misconceived. To quote from the Information Paper which, while considering issues of procedural fairness and natural justice, noted

> *This does not mean that the Commission will necessarily wait until it has admissible evidence sufficient to convince the Federal Court of a contravention before issuing a notice. Rather, the Commission will make the decision whether to issue a notice, after giving proper, genuine and realistic consideration to the merits of the case.*

The competition notice guidelines

These guidelines reflect the discretionary factors the ACCC takes into account in deciding whether or not to issue a notice once it decides that a contravention has taken place. They are based on the commission's policy goals as listed below.

- Compliance with the competition rule (and other provisions of the Act) and, in particular, the cessation of anti-competitive conduct.
- Improvement in market conduct, generally by carriers and carriage service providers.
- The protection of consumers from the adverse effects of anti-competitive conduct, and informing the community about the operation of the Act in telecommunications markets and its implications for business and consumers.
- Efficient and effective use of the ACCC's resources.

Compliance with the competition rule

Positive factors

- Whether the ACCC is likely to enforce the competition rule by seeking a pecuniary penalty or commencing other proceedings, in the event that the competition notice is issued and the subject of the competition notice does not cease the anti-competitive conduct.
- Whether any person has informed the ACCC of an alleged claim for loss or damage by anti-competitive conduct, or of an intention to seek an injunction under section 151CA in relation to the anti-competitive conduct or the ACCC otherwise considers that any person is likely to institute such action, given that a failure to issue a competition notice with respect to that anti-competitive conduct could unreasonably prevent that person from having that claim heard before, or seeking that injunction from the court.
- Whether the issue of a competition notice may dissuade or deter carriers or carriage service providers other than the target of the notice from engaging in anti-competitive conduct.

Negative factor

- Whether the carrier or carriage service provider has already ceased engaging in the anti-competitive conduct and the ACCC considers the conduct is not likely to recur, and considers there is no benefit to the participants in the industry, consumers, or the community, in issuing a competition notice in response to the past anti-competitive conduct.

Improvement in market conduct

Positive factor

- Whether the issuance of the competition notice serves to signal the ACCC's approach to anti-competitive conducts to participants in telecommunications markets, thereby providing greater regulatory certainty to those participants.

Negative factor

- Whether the anti-competitive conduct is an inconsequential contravention of the competition rule.

Protection of consumers

Positive factors

- Whether the anti-competitive conduct has an adverse impact on consumers. In assessing the impact of anti-competitive conduct on consumer welfare, the ACCC will examine the long-term effects of that conduct.
- Whether making the details of anti-competitive conduct public by means of the entry of the notice on the Register

will serve to warn consumers of, or protect consumers from, the adverse impact of that conduct.

Efficient use of resources

Positive factors

- Whether the reasons for issuing the competition notice are not inconsistent with the ACCC's publicly stated approaches to administering other provisions of the Act (such as Part IV of the Act).
- Whether, in the ACCC's view, any likely benefits to the participants in the industry, consumers, or the community outweigh the costs of deciding to issue, and issuing, that notice. The ACCC notes that, as a general rule, deciding whether to issue a competition notice and issuing that notice are likely to cost less than (for example) the preparation and commencement of proceedings under Part IV and VI of the Act.

Negative factor

- Whether the outcomes identified by each of the three previous headings could be more expeditiously and effectively secured by taking action under another provision of the Act or by taking some other action.

The guidelines note that in most cases, where it investigates anti-competitive conduct and forms the view that the conduct is taking, or has taken place, issuing a competition notice is an appropriate and positive step to achieving policy goals.

Part XIB case studies

ISDN Data Services

Recently, the ACCC investigated complaints from service providers that they faced shortages or complete loss of supply of connections between their networks and their customer's premises over the Telstra ISDN (Integrated Services Digital Network) and that Telstra proposed to drastically increase the price of ISDN access to its competitors.

This investigation involved Telstra's decision to progressively withdraw the XSPCs (ISDN calls with a fixed charge, also known as 'semi-permanent circuits') and replace them with a Telstra product known as Onramp Xpress. This withdrawal of one product and replacing it with another – of a product that is a vital input to competitors – was perceived by the ACCC to be done in a manner which could have significantly harmed competition. The XSPCs became progressively more difficult for competitors to obtain and delays in the launch of Onramp Xpress meant that no alternative Telstra products were available at comparable prices. Telstra had an alternative access technology and was not generally affected by the shortages of supply via ISDN access services.

If the resultant squeeze had continued, it could have led to competitors being unable to access services which are needed to connect new customers, and prices for the new service were 40% higher over short distances than those previously incurred by competitors for obtaining the XSPCs.

After the commission made Telstra aware of its concern, including the possibility of issuing a competition notice, Telstra spent 3.5 million dollars on infrastructure to supply the XSPCs prior to the release of Onramp Xpress in areas where Onramp Xpress was not yet available; and launched a second phase trial for Onramp Xpress with considerably reduced capped pricing and ultimately released final pricing details for that product. Those final prices are considerably lower than initial trial prices.

The ACCC ultimately determined that while Telstra had taken advantage of market power within the market for access services to data markets, such conduct had not substantially lessened competition. Price and supply squeezes in those markets had had an effect upon competition, but given their extent and duration the effect had not been substantial.

This was largely due to the remedial action taken by Telstra once it became aware of the ACCC's investigation. Remedial action does not on every occasion lead to substantial lessening of competition. If each of the other elements of a contravention of the competition rule is present, it is for the ACCC to decide in each case what the effect of the conduct is upon competition. Issues with regard to product migration are likely to continue to be of concern to the ACCC in the future.

Internet access and interconnection arrangements

Telstra charges a retail tariff for anyone connecting to the Big Pond Internet Backbone. The tariff consists of connection and download charges. For connections over 1 mega byte per second capacity, the download charge is 19 cents per mega byte irrespective of the source of the traffic, and so has greatest impact on other backbone providers who thereby aggregate traffic volumes. This acts as a barrier to becoming a large IAP (Internet access provider). The IAPs have complained that

- the 19-cent download price is anti-competitive because it bundles domestic Internet traffic with international traffic forcing domestic users to subsidize Telstra's international traffic

- as it is not a reciprocal arrangement, the IAPs are forced to subsidize the Big Pond backbone costs without receiving any offset to their own backbone costs and
- lower prices for connections of 64 kilo bytes per second capacity are a disincentive for the growth of the backbone business.

The ACCC found that conduct relating to bundling and the pricing of 64 kilo bytes per second connections did not breach the competition rule because these are the issues regarding market power and resulted in no substantial lessening of competition. Competitors responded by introducing unbundled pricing of their own and lower pricing than Telstra to maintain or increase market share.

The ACCC has not yet decided whether Telstra's refusal to negotiate arrangements for reciprocal Internet interconnection breaches the Act. The ACCC has continued to closely monitor the progress of negotiations between parties in the industry to ensure that there are no constructive refusals regarding dealing by any party which may have market power. Reciprocal arrangements which recognize the value of content from other networks are the key to the resolution of this issue. When Telstra released a credit settlement plan that was fundamentally a wholesale discount plan, the ACCC was quick to reject it as a complete solution to the issue. The ACCC recently elicited from Telstra its criteria for the negotiation of reciprocity agreements and a commitment to additional resources devoted to negotiations. This matter will continue to be under very close scrutiny.

Internet dialup charging

The ACCC investigated the matter when dialup subscribers to ISPs (Internet service providers) reported that they were finding their telephone bills quadrupling in some cases, mainly due to extremely short duration calls to the ISP number. Some ISPs and customers are alleging that many of the calls are actually for engaged signals. Telstra believes that the problem is because of equipment faults at the ISP end. Telstra commissioned an independent network audit to determine the source of the problem. The audit will be performed by Price Waterhouse who will report to a working group consisting of Telstra, the ACCC, the Telecommunications Industry Ombudsman, and the Internet industry of Australia.

PhoneAway

The ACCC has also been looking at prepaid phone card services. It is alleged that Telstra is able to maintain the price of the local call component of its prepaid phone card product, PhoneAway, lower than that offered by its competitors, by keeping the cost of the input services used by its competitors relatively high.

The question facing the ACCC is whether substantial power in the market for inbound services, particularly 1800 services, gives Telstra the power to control the costs and revenues of its competitors, and thereby 'squeeze' their possible margins.

The ACCC's preliminary view is that the market for phone card services is competitive, with a dozen or so players, some with significant market share and a few offering low-priced local calls to their customers. Indeed, some of the complainants' market position may even have improved since the alleged conduct began. Despite the fact that the local call component of these services does not appear to be an important part of the product from an end-user perspective and is not highlighted in promotional material, inquiries into the extent to which Telstra's pricing of such calls relies on its market power continue. Further information about the competitive impact of this conduct has been sought from market players.

Part XIC: access provisions

The access provisions in Part XIC and conduct provisions in Part XIB are regarded by the ACCC as complementary tools that can act to reinforce the ACCC's powers, rather than separate regulatory mechanisms for addressing market concerns. The commission does not consider that there is any ground for dividing actions which potentially undermine the competitive process into 'conduct' issues (to be dealt with by Part XIB) and 'access' issues (to be dealt with under part XIC). Whether the conduct occurs during or in relation to the supply or acquisition of a service which also is, or is eligible to be, a declared service under Part XIC is not relevant to the question of whether a carrier or carriage service provider has engaged in anti-competitive conduct.

Under some circumstances, a competition notice may be the most effective response to anti-competitive conduct. In other situations, operation of the access regime may be more effective. There are also some circumstances where both a competition notice and action under part XIC may be required – for example, where the competition notice addresses the short-term anti-competitive impact of the impugned conduct, and the access regime is best equipped to determine a long-term solution.

The ACCC considers that the most fundamental competition issue at stake is to ensure that there is effective regulation of access by new entrants to the access provider's network. In the telecommunications industry, the access provider has substantial advantage over new entrants through control of access to key network elements; and the historical development of asymmetrical network and market information.

Denying or impeding access to key network elements, such as the Customer Access Network, can constitute a barrier to entry and efficient competition in dependent markets (such as long-distance telephony services). While infrastructure duplication is essentially an industry decision, the role of regulation is to ensure that industry's decision about whether to roll out a new network is not distorted by access conditions being too harsh (leading to either a lessening in competition or wasteful duplication) or too lax (leading to inefficient use of existing facilities). The aim, therefore, is to ensure that decisions are consistent with the long-term interests of end-users.

It is important to bear in mind that the regulated access regime will not apply to all telecommunications services. It will only apply to declared services. Declared services are those services which are necessary to be regulated in the long-term interests of end-users. These are considered important in facilitating the promotion of competition in related markets or for any-to-any connectivity.

The ACCC deemed certain services as declared services in its Statement under the Transitional Legislation on 30 June 1997. The ACCC issued an information paper on the public inquiry process which must be undertaken in certain circumstances in relation to the declaration of telecommunications services[2].

The ACCC is currently developing a paper discussing the key test of the LTIE (long-term interest of end-users), and is currently assessing Telstra's undertakings, and conducting public inquiries into whether certain services should be declared under the LTIE test. The three objectives the ACCC must consider while determining whether a particular thing promotes the LTIE are (1) promoting competition in markets for listed services, (2) achieving any-to-any connectivity, and (3) economically efficient use of, and investment in, the infrastructure.

The ACCC also determined its approach to access pricing following the issue of guidelines on access pricing and inputs from the industry. It follows these principles while assessing undertakings and conducting arbitration.

---

[2] These papers can be obtained either from the Canberra or Melbourne office of the ACCC or from its Internet home page at www.accc.gov.au.

The access pricing principles, as well as the record-keeping rules which are being developed, are intended to reduce some of the information asymmetry that would otherwise exist. The access pricing principles are intended to guide parties in their access negotiations and do not attempt to specify an actual price based on some all-encompassing costing principle. The approach rather is to set certain limits on pricing behaviour by incumbent access providers, through specific anti-discrimination and competitive parity rules, and to investigate cases more closely where breach of the rules is evident. The ACCC has made it abundantly clear to the industry that the pricing principles will guide its determination of pricing terms and conditions in an undertaking or its assessment of whether pricing in an access undertaking is reasonable.

Experience in applying Part XIC issues to date

Many competition issues are structural, that is, they relate to access of carriers or service providers to another carrier's network. Recent experiences in administering access issues under Part XIC are mentioned below.

Telecommunication Access Forum access code

The ACCC has approved the access code developed by the TAF (Telecommunication Access Forum), which includes model terms and conditions for access to declared services, and provides a fast-track approval route for access undertakings that adopt this code. The code provides more certainty for both access providers and access seekers and eliminates the need for each term and condition to be individually negotiated. The code's development demonstrates that the self-regulation of industry can work and has an important and continuing role.

Domestic intercarrier roaming

In September 1997, the Minister for Communications requested the ACCC to consider conducting an inquiry into whether domestic intercarrier roaming should be 'declared' under Part XIC, to provide potential bidders of the spectrum auction with as much certainty as possible regarding their ability to roam on to the existing digital networks.

The ACCC recently conducted an inquiry into whether to declare services facilitating intercarrier roaming between existing and new digital mobile networks, that are to be established in the 800 MHz and the 1.8 GHz bands. Under Part XIC, services can be declared if they are in the LTIE.

The ACCC has worked with interested parties and the TAF to establish what services could be declared. The ACCC also engaged a consultant for technical advice on the nature of roaming and related services. Roaming, whether commercially negotiated or provided under the access regime as a declared service, will facilitate new entry in mobile communications by allowing customers of the new network to roam on to existing networks. Therefore, new entrants will be able to offer national coverage before their own network roll-out is completed. The ACCC expects to announce its decision with regard to the declaration inquiry in the near future.

Facilities access code

Upon request from the Minister for Communications, the ACCC has developed a draft code of Access to Telecommunications Transmission Towers, Tower Sites and Underground Facilities. Compliance with facilities access code is a licence condition for carriers. This code provides interested entrants into the mobile market with guidance on the processes and procedures for obtaining access, and encourages the co-location of facilities where reasonably practicable. The ACCC is currently assessing the public submissions received in response to the draft code. The code will be finalized in early March in order to provide the potential bidders for the government's spectrum auction with greater certainty.

General provisions of the Trade Practices Act

In addition to the specific provisions of the TPA dealing with anti-competitive conduct in telecommunications markets and regulation of access, the other general provisions of the TPA also apply and play an important role in enhancing the welfare of Australians through the promotion of competition and fair trading. These objectives are served through various provisions which prohibit not only restrictive trade practices but unfair trading activities such as misleading and deceptive conduct, and unconscionable conduct which imply certain warranties and conditions into consumer contracts as to fitness for purpose and merchantable quality.

The general provisions for restrictive trade practices found in Part IV of the TPA can be seen as establishing boundaries between what constitutes acceptable and unacceptable market conduct. Subject to keeping within those boundaries, market participants are free to order their affairs as they see fit. Part IV contains various prohibitions such as dealings between competitors that restrict competition, misuse of market power, anti-competitive exclusive dealing, resale price maintenance, and mergers or acquisitions of assets that substantially lessen competition.

Where market participants feel at risk under those provisions, they can apply for authorization, with the exception of the prohibition against misuse of market power (in section

46), on the grounds that the conduct results in a public benefit which outweighs the detriment to competition caused by the conduct. Exemption from provisions for exclusive dealing also can be achieved through a formal notification process which exempts the conduct until and unless the ACCC revokes the protection. As with a number of the decisions made under Parts XIB and XIC, persons affected by its decisions can seek a review by the Australian Competition Tribunal.

The remedies available to the ACCC under the general provisions include

- penalties of 10 million dollars for companies and $500 000 for individuals for restrictive trade practices, $200 000 for corporations, and $40 000 for individuals for some consumer protection prohibitions
- injunctions
- damages
- in the case of a prohibited merger, divestiture of shares or assets illegally acquired, or a declaration that a share transaction is void
- ancillary orders of various kinds in favour of persons who have suffered loss or damage because of the conduct including specific performance, rescission, or variation of contracts, and damages.

Other ongoing competition issues

Number portability

Number portability is basically the ability of end-users to change their carrier or carriage service provider and retain the same telephone number within the constraints of the Numbering Plan.[3]

The provision of number portability lowers the switching costs (when changing to another carrier or service provider) thereby reducing the competitive disadvantage faced by alternative providers. Accordingly, the number portability facilitates the development of competition between carriers and carriage service providers in the supply of services.

Under the Telecommunications Act 1997, the ACCC has statutory powers to direct the ACA (Australian Communications Authority) in regard to number portability. The ACA cannot put rules about number portability in the Numbering Plan unless directed to do so by the ACCC, and any rules the ACA puts in the plan regarding number portability must be consistent with the directions by the ACCC. The Numbering Plan is the plan for the numbering of carriage services in

---

[3] This definition is similar to the definition of number portability contained in the Explanatory Memorandum to the Telecommunications Act, 1997.

Australia and the allocation and use of numbers in connection with the supply of such services.

The ACCC issued directions to the ACA in September 1997. These directions are available to the public and can be obtained from either the Canberra or Melbourne offices of the ACCC. (The directions are also available on the ACCC's Internet home page.)

The ACCC also sought from the ACA a report on the technical feasibility of mobile number portability. This report is expected to be received in the near future.

Industry participants are aware that the question of 'who pays' for the costs of local number portability has long been a source of contention and was the subject of a long and ultimately unresolved Austel arbitration between Telstra and Optus. The ACCC is in the process of developing pricing principles for local number portability which will aid industry participants in commercial negotiations and set out the principles the ACCC would apply in an arbitration.

Assessment of Telstra's undertaking for interconnection prices

The ACCC is currently assessing the prices Telstra proposed to charge other carriers for interconnection with its fixed-line and mobile phone networks. The draft undertaking by Telstra specified the terms and conditions for the origination and termination of calls on its fixed-line and GSM (global system for mobile communications) networks, as well as the resale of advanced mobile phone service calls. The undertaking covers a period of three years.

The ACCC must determine whether the terms and conditions in the undertaking are reasonable. If accepted by the ACCC, the undertaking will determine the terms and conditions on which access seekers obtain interconnection to Telstra's network, in the absence of commercial agreement between the parties.

The ACCC is conducting a highly detailed cost study of the prices constrained within the undertaking to assess whether they are reasonable (as defined in the legislation) and in accordance with the ACCC's access pricing principles. This will involve a number of tasks including

- international benchmarking on the prices contained in the undertaking
- estimating the forward looking cost of providing PSTN (Public Switched Telephone Network) originating and terminating access in accordance with the ACCC's access pricing principles
- determining the appropriate approach to estimating the cost of capital in providing the services within the undertaking

- assessing whether the non-price terms and conditions are reasonable.

Importance of industry self-regulation

The effectiveness of the ACCC's administration of competition and access in telecommunications will continue to remain largely reliant on the continued progress of industry self-regulation.

As the industry matures and becomes more multifaceted and pluralistic (in terms of number and type of networks and facilities), one important evolution will be the increasing reliance on self-regulation. This reliance applies to a variety of codes such as consumer and technical codes of practice (approved by the ACA) but is no less important with regard to access. In such a complex and technically detailed network industry as telecommunications, it is desirable to encourage participants who have knowledge on such matters to participate in multilateral forums through which standard terms and conditions can be developed and applied. This is also the purpose of the access code provisions which allow model terms and conditions to be adopted in undertakings by individual carriers or carriage service providers.

The Australian regulatory regime in telecommunications recognizes and provides for an increasing role for industry self-regulation. The work of the Australian Communications Industry Forum and the TAF has so far proven valuable in contributing towards this issue. The TAF access code has been a significant achievement by the industry.

While the TAF has not been able to reach a consensus about making recommendations on the declaration of additional services, the ACCC has been encouraged by the TAF's work in putting procedures into place which enable it to play a useful role in specifying the services and in developing statements of pros and cons for declaration. The information has been passed on to the ACCC to become part of its assessment and inquiry process into declaring services. The ACCC has already embarked on a number of public inquiry processes and more are planned to commence in the very near future.

The ACCC urges the industry to continue, and build upon, its work in these areas so that the full benefits of open competition can be achieved.

Oil and Gas

Session 1 Regulatory framework

Session 2 Market structure

Session 3 Tariff setting

Session 4 Regulatory reforms: present and future strategies

■

Background paper: issues in the deregulation of the oil and gas sector
R K Narang, Ardhendu Sen, and Leena Srivastava

■

Legal and regulatory framework for the oil and gas sector in India
Jyoti Sagar

■

Regulatory framework
R K Narang

■

Regulatory authority
M S Ramachandran

■

Need for an integrated regulatory authority for the hydrocarbons sector
J M B Baruah

■

Implementation of a regulatory framework: the Indian gas industry
R P Sharma

■

Oil marketing reforms: concerns
P Raghavendran

■

Market issues
R K Batra

■

Market structure after deregulation: promoting competition among public sector oil companies
S Behuria

■

Market structure
S N Jha

■

Regulatory framework for the gas industry in India
J K Jain

■

Tariff setting and pricing: oil and gas sector
Larry B Morse

■

Tariff and price setting in the oil sector
V K Chawla

■

Regulatory reforms: implementing strategies
Subir Raha

■

Can the tortoise always win? Petroleum deregulation in India
Leena Srivastava

■

Transition to a liberalized environment: comment on implementation strategies
Joanne M Kauffman

■

Australian gas reform
Allan Asher

■

Summary of question and answer sessions

TERI,
New Delhi

R K Narang, Ardhendu Sen, and Leena Srivastava

Background paper: issues in the deregulation of the oil and gas sector

Transition to a liberalized environment: experiences and issues in regulation 411-426

The petroleum industry in India has been closely regulated: the GoI (Government of India) has subjected each link in the chain – E&P (exploration and production), refining, marketing and distribution – to controls and checks. The oil crises of the 1970s were major drivers in prompting governments all over the world to intervene in the oil sector. The intervention was especially pronounced in oil importing countries such as India. As a result of the price hike, the Indian oil industry underwent a metamorphosis. The principle of import parity in pricing gave way to an APM (administered pricing mechanism) with an attendant command and control system. The need to ensure oil security led to the acquisition of foreign oil companies that virtually controlled the oil industry in the first half of this century. Notable among these were Burmah Shell, ESSO, Caltex, and Indo-Burmah Petroleum. The rationale was that on their own, markets would not provide supply security or lead to socially desirable outcomes.

Under the APM, all entities are assured a minimum return on their investments. While the ONGC (Oil and Natural Gas Corporation Limited) and OIL (Oil India Limited) are allowed a return of 15% on employed capital, the downstream companies get 12% (post tax) on their net worth.

Though there are incentives for exceeding the norms laid down by the OCC (Oil Coordination Committee), it is widely accepted that the system neither fosters innovation nor offers any significant incentive for efficiency. Some of the criticisms of the system are enumerated below.

- It puts a low premium on innovation and efficiency.
- It leads to non-optimal investment decisions that are not in conformity with market dynamics.
- Since the government controls product prices, political forces exert pressure on price levels. In the electricity sector, this has led to non-viability of most state electricity boards and in the oil sector, the result was an oil pool account deficit of 150 billion rupees.
- With an oil–gross domestic product elasticity of more than unity, India has been one of the world's fastest growing oil

markets. Subsequent to the 1991 reforms, oil consumption has been growing at a rate of over six per cent. Although there has been a slowdown in the current year, India is still the fourth largest oil market in Asia with an annual consumption of over 85 MT (million tonnes). The growth in demand is expected to be robust in the next decade and OCC projections indicate that demand will reach 155 MT by 2006/07. Meeting such a demand would require massive investment, far beyond the scope of the public sector. This calls for the involvement of the private sector, both domestic and foreign.

Criticism of oil sector regulation and the need to attract private investment has caused far-reaching changes in the regulation of the oil industry. The objectives of this deregulation are outlined below.

- Increase competition in the industry by allowing the entry of more players. Only a competitive market can spur oil companies to deliver value to consumers and ensure the international competitiveness and long-term survival of the Indian oil industry.
- Attract private capital which, in turn, requires that market forces be allowed to operate freely.
- Remove constraints on economic pricing of products and services to enable the industry to earn a reasonable return on investment.

It should be noted that India was not alone in introducing these reforms. Deregulation has swept the oil sector around the world.

To kick-start the deregulation process in the petroleum industry, the GoI appointed the R Group with experts drawn from the government and the private sector. The R Group suggested major policy changes in its report submitted in 1996. The recommendations included the dismantling of the APM and tariff reforms. The government accepted these recommendations and took a series of measures over the last two years, which have changed the regulatory framework drastically. The notification brought out by the government in November 1997 announcing the phased dismantling of the APM from April 1998 was of special importance. The notification had the following features.

- Fixed time frame (four years) for dismantling the APM
- Linking the price for domestic crude oil to the international price
- Abolishing the retention price for refineries

- Ex-refinery price of controlled products to be fixed by the OCC
- Adjusted import parity for existing refineries
- Tariff adjusted import parity for new refineries
- Decontrolled products-refineries free to set prices
- Rationalization of customs duty on crude oil and products to provide protection to refineries
- Marketing rights for new players, subject to conditions
- Reduction of subsidies on kerosene and LPG (liquefied petroleum gas)
- Establishment of a regulatory body

The rationale for and the nature of the reforms introduced in the upstream and downstream petroleum sectors and the natural gas sector are discussed below.

Exploration and production

The widening gap between domestic production and consumption has put a serious strain on the Indian economy with the import bill rising over the years to 260 billion rupees in 1997/98. Keeping this in view, the GoI has taken several initiatives to increase the pace of exploration and secure increasing participation of the private sector. India has around 3.14 million km^2 of sedimentary area in 26 basins. Only one-third of this area has been explored so far, that too moderately. Of late, efforts have been made by the national oil companies and the DGH (Directorate General of Hydrocarbons) to open up the unexplored areas by upgrading seismic data. The DGH has been able to cover 0.4 million km^2 during the last two years through the joint venture speculative survey programme. The DGH has also covered 1.3 million km^2 of offshore areas up to a depth of 3000 m by satellite gravity surveys.

To supplement the exploration done by the two national oil companies, the government has been regularly inviting private sector offers for exploration in notified blocks. Starting in 1979, there have been nine rounds of such offers. In the 1990s, a round was being offered every six months. The government also offered a few small- and medium-sized fields for development by private parties. So far, 32 exploration blocks and 30 discovered fields have been awarded for exploration and development. A few more contracts may be signed soon. Production of crude oil from private / joint venture fields has exceeded 3 MT; around 7 million cubic metres per day of gas is also being produced. The investment attracted into this sector has exceeded 1 billion dollars.

These achievements have, however, fallen short of expectations partly because of factors beyond the control of the government such as low international price of oil. But the government was blamed for the delays associated with the process of finalization of the production-sharing contracts and subsequent delays in various approvals required by the private operators including the exploration licensees. The government has not yet concluded the crude sales agreements with the signatories of production-sharing contracts signed three to four years back.

The government has now further liberalized the terms of offer for exploration blocks by unveiling the NELP (New Exploration Licensing Policy). Recently, 48 blocks including 38 offshore blocks, of which 12 are deep-sea blocks, were offered under this policy. Apart from better terms offered to bidders, an outstanding feature of the new policy is that it offers a level playing field to the national oil companies and private operators. The ONGC and OIL will, henceforth, have to bid for blocks instead of being awarded blocks on nomination and would have to relinquish them under specified conditions applicable to all. The new terms offered by the government include the following.

- The possibility of seismic option in the first phase of the exploration period
- No minimum expenditure commitment during the exploration period
- No signature, production, or discovery bonus
- No mandatory state participation
- No carried interest by the national oil companies
  - Income tax holiday for seven years from start of commercial production
  - No customs duty on imports required for petroleum operations
  - Biddable cost recovery limit up to 100%
  - Option to amortize exploration and drilling expenditures over a period of 10 years from the first commercial production
  - Sharing of profit petroleum, based on pre-tax investment multiple achieved by the contractor and biddable
  - Royalty from on-land areas payable at the rate of 12.5% for crude oil and 10% for natural gas. For offshore areas, it is payable at 10% for both oil and natural gas. Royalty for discoveries in deep water areas beyond 400 m isobath will be chargeable at half the applicable rate for offshore areas for the first seven years of commercial production.
  - Fiscal stability provision in the contract
  - Freedom to the contractor for marketing oil and gas in the domestic market

- Provision for assignment
- Conciliation and Arbitration Act, 1996 based on UNCITRAL shall be applicable
- A petroleum tax guide compiled for the benefit of bidders

While these attractive terms would be welcome by all, the prospectiveness of the blocks on offer is not high enough to get the desired response. The speed with which the bids are now processed and the assistance extended by the DGH and the MoPNG (Ministry of Petroleum and Natural Gas) will be the crucial determinants in the future success in this effort.

The legal framework of regulation of E&P of oil and gas is provided by the Oilfields (Development and Regulation) Act, 1948 and the Petroleum and Natural Gas Rules, 1959. These provide the powers to grant licences for E&P, charging of royalty, etc. The above Act was recently amended to enable the government to introduce the NELP.

The DGH was set up by the government in 1993 with the objective of

- ensuring correct reservoir management practices
- reviewing and monitoring exploratory programmes and development plans of national oil companies and private companies
- monitoring production and optimal exploitation of gas fields.

Such functions can be effectively performed by the DGH only if it derives its authority from the law. As such, the government is reportedly considering the conversion of the DGH into a statutory authority. This needs to be expedited. The DGH has to combine regulation with promotion of private efforts in E&P. This is important as government regulation involves a large number of agencies and private investors that need a single point of reference to solve their problems. This will make the job of the DGH difficult and delicate.

efining and arketing

The downstream sector is regulated mainly by the Indian Petroleum Act and a number of control orders passed by the government under the Essential Commodities Act. The OCC, under the administrative control of the MoPNG, currently performs the function of planner, coordinator, adviser, and regulator in the downstream petroleum sector. During and after the dismantling of the APM, there will be a need for a statutory regulator to undertake these functions for both the public and private sector oil companies till the market becomes fully competitive. The government has assigned to TERI the task of drafting a legal framework for the regulation of the downstream petroleum sector after decontrol by the government. A draft prepared by TERI is now under consideration at the MoPNG.

The transition to a fully deregulated and competitive oil industry cannot be made in a day. Though a short transition period would help in mobilizing investments quickly, the sharp rise in prices will reduce the political acceptability of the reforms. The R Group recommended a transition period of six years. The government, however, opted for a four-year transition period (1998–2002).

Another issue is the sequencing of reforms. The GoI has thrown open refining while keeping substantial control over marketing. Only those who have invested 20 billion rupees in refineries or are producing at least 3 MT of crude oil annually are eligible to have marketing outlets for controlled products (motor spirit and high speed diesel). A greater deregulation in the marketing sector is essential for a fully competitive market to operate. Besides, a simultaneous opening up of the two sectors could stimulate investment in refineries.

While designing a regulatory system consistent with decontrol, the country's level of poverty, its large geographical expanse, and ecological diversity have to be considered. A reform that is seen to be pro-rich or anti-poor will not be acceptable. The economically deprived sections and people living in far-flung regions may continue to need subsidies on essential products like kerosene and diesel. If cross-subsidies are to be removed, alternatives must be found.

A removal of controls in today's regulatory environment would imply free sourcing of crude oil, independent determination of the crude slate and product pattern, removal of marketing and distribution controls, dismantling of sales plan entitlements, decontrolling of refining and marketing margins, and resellers' commissions. In such a scenario, the downstream hydrocarbon sector would be largely shaped by market forces. The role of a regulatory body would be quite limited and restricted to enabling provisions allowing the regulator to

- monitor the movement of prices and prevent the formation of cartels
- facilitate the supply of petroleum products to all areas of the country, including remote and disadvantaged areas
- ensure compliance with strategic obligations and safety, health, and environmental concerns
- provide a quasi-judicial dispute settlement mechanism
- facilitate the operationalization of government policy, as required
- intervene in times of national and international emergencies

- be fully informed about the state of the oil industry through the collection of complete data.

Apart from the above, regulation would be automatic and driven by the forces of competition. However, the various infrastructure bottlenecks in the import, transportation, refining, and marketing of products that come in the way of efficient market functioning need to be recognized. Till these bottlenecks are removed, the regulator would be managing the transition to a fully deregulated industry. The role of the regulator in the transition period and thereafter is discussed below.

Licensing of refinery capacity

Different countries have adopted different approval procedures for expansions and grass-roots projects. In Japan and Thailand, expansions do not require any approval. New capacity in Japan is subject to a licence, while in Thailand new capacity can be set up only in the joint sector. In India, refineries need a licence that is granted after the government satisfies itself that the refinery is required and viable. In the case of public sector refineries, such examination becomes detailed and time-consuming.

One option is to continue the present licensing procedure. The other option is to require only that the regulator be intimated and make the grant of a license more or less automatic. Since refineries involve large investments, the proposals are expected to be appraised by financial institutions with little need for any other authority to look into the feasibility of the project. This would have the advantage of reducing delay and discrimination in licensing. The regulator may also be charged with the responsibility of monitoring the progress of licensed projects and rendering assistance to these projects, as feasible.

Sourcing of crude imports

At present, the IOC (Indian Oil Corporation) is the sole canalizing agency for crude imports for public sector refineries. The OCC makes estimates of product demand and domestic production. The import requirements projected by the OCC have to be approved by the government before imports are made. The allocation of the imported crude to refineries is supervised by the OCC. Under the reforms initiated w.e.f. April 1998, joint sector and private sector refineries have been given the freedom to import crude for their own use.

Internationally, refiners are allowed unrestricted import of crude, subject to meeting environmental standards. This is important for refiners as their profitability depends critically on the crude price. In a market where the price changes daily and unpredictably, autonomy in purchase decisions can help reduce costs substantially. The refiners can also use hedging instruments offered by the future markets to protect themselves. There is, thus, a case for extending the freedom to import crude to the public sector refineries also. The trade-off is that the price advantage of bulk purchases, if any, would have to be given up.

Sourcing of products

As in the case of crude imports, all marketers and consumers could be allowed to import petroleum products. This is the practice internationally and would be in keeping with the progressive decanalization of product imports allowed by the GoI in the 1990s. The government has already allowed private import of many important products such as naphtha, low sulphur heavy stock, LPG, and kerosene. The import of these products, notably LPG, has attracted a sizeable investment from the private sector. The competition among importers has benefited consumers by bringing the prices down through the import of higher-sized parcels.

Strategic petroleum reserves

The government recently announced the decision to build up a strategic reserve of 45 days' imports in addition to operational stocks covering 21 days' consumption. This decision will be welcome all over the world as India, with a large and growing requirement for imports, could affect the oil price in a crisis. However, a host of issues need to be addressed if optimum benefit is to be derived from these stocks. These would include the size of the emergency reserve, the kind of storage to be used, the drawdown rate to be designed, the proportion to be held as crude or as products, and the composition of the product basket. Then, there is the most important question of financing the stockholding. For the successful involvement of the private sector in holding and utilization of stock, the government has to arm itself with the necessary legal powers. There are many arrangements and legal instruments in use in the countries that have built up strategic reserves.

Refinery production pattern and ex-refinery pricing

As the ex-refinery prices move towards import parity, the refineries choose the product mix that optimizes the value added. The refineries need full freedom to select the product mix and the present system of coordination by the OCC may have to be discontinued even for public sector refineries.

Inland movement of products

The OCC has the responsibility to move products to the consuming centres from the refineries and import points. This is accomplished through the supply plans drawn up every month. To what extent will the market be able to bring about the same result? Would it reach products to remote and poor regions as per the requirement? This is an important question and the regulatory system will have to tackle this problem successfully. Product pipelines will be important in the overall movement of products in the future. The regulatory powers in respect of pipelines must be clearly defined.

Marketing set-up

Oil marketing companies need full freedom in setting up their dealership network and fixing the dealers' commissions and the selling price of the products. However, this assumes a fair degree of competition. The regulator will need powers to intervene during the transition period if prices are hiked unreasonably following a local disruption in supplies. This would need a careful definition of what is reasonable and what is not.

Safety concerns

Compliance with the existing rules and regulations concerning safe storage and handling of petroleum products is now enforced by the Chief Controller of Explosives. Guidelines are laid down by the Oil Industry Safety Directorate for safety in plants, equipment, and facilities. Public sector oil companies follow these guidelines voluntarily. It is obvious that these guidelines need the backing of law if they have to be enforced on private oil companies. A single agency could be entrusted with this work to avoid coordination problems and conflicts.

Structure of the regulatory authority

The following important issues must be resolved while laying down the structure of the regulatory authority.

- Should the regulatory body be a single-member or a multi-member body? There are obvious advantages and disadvantages in both options.
- How do we ensure the selection of persons of proven competence and integrity? How do we secure the independent functioning of the regulator?
- How do we ensure a clear demarcation of responsibilities between the ministry and the regulator? This is important for proper relations to develop between the two.
- What should be the conditions under which a regulator could be removed from office?
- What should be the procedures followed by the regulator? While public hearing on important issues is desirable, the regulator must terminate the proceedings within a reasonable time period.
- What should be the powers of enforcing decisions and penalizing offenders?
- What should the sources of revenue for the regulator be? Dependence on the government for funds could affect the independent functioning of the regulator.

These and other such questions have to be addressed while laying down the structure of regulation. In an industry that is so highly dependent on advanced technology, inter-industry consultations are important. In many countries such interactions are facilitated through industry federations. The fallout in terms of improved productivity has been impressive. It should be one of the tasks of the regulator to encourage the formation of such a federation.

Natural gas sector

Although commercial utilization of gas started in the 1960s, it picked up only after the development of the Western Offshore fields in the late 1970s. The Seventh and the Eighth Five-Year Plans saw a rapid rise in gas utilization up to the current level of around 24 billion cubic metres annually. In 1986, the Hazira–Bijaipur–Jagdishpur pipeline was laid to bring the Western Offshore gas to fertilizer plants in the western and northern states. Since 1987, the government has been fixing the price of gas. The government has also been deciding the allocation of gas to various competing consumers. Having decided on a decontrol of this sector, the government commissioned a study on the options for gas sector regulation after decontrol. The study was done by the National Economic Research Associates of UK. The recommendations of the study have been considered by the GoI in consultation with the industry, and it is likely that the government will bring in legislation to appoint an independent regulator for the gas industry.

The points made for the downstream petroleum sector apply equally to the natural gas sector. However, the transportation of natural gas through pipelines involves significant economies of scale and very little inter-modal competition. Owing to these natural monopoly features of gas transport, this sector calls for a set of regulations not required for petroleum products. These questions are discussed below.

Common versus contract carriage

The key features of common carriage are that while transmission is provided on an 'as required' basis, users are not committed to long-term use-of-system contracts. This means that the transmitter must construct additional capacity to cope with all anticipated demands for its services. The transmitter, therefore, has significant demand forecasting and investment obligations, but the quid pro quo is usually a right for the transmission company to recover all costs and earn a reasonable RoR (rate of return) on all authorized assets. The need to meet all user requirements almost inevitably means that forecasts overestimate demand and result in provision of surplus capacity.

The essence of contract carriage is that individual transmitters need to provide additional facilities only where users are willing to sign firm contracts for their use. In the case of existing facilities, transmitters are obligated to provide transmission services up to the extent of any spare capacity. This means that system development generally takes place in response to demand from users, and this in turn facilitates the financing of new developments.

In the case of both contract and common carriage, regulation would provide the same assurance that use-of-system services could be obtained by any party where surplus capacity existed. However, in contract carriage, the concern is about what would happen when development of new capacity is required but no developer comes forward at the appropriate time. In contrast, it is assumed that with common carriage it would be possible for the government or the regulatory body to require one of the transmission operators to provide the necessary capacity. Arrangements of this type are more difficult in India where the transmission network is relatively undeveloped and new developments may represent a significant addition to the network and impose disproportionately large additional costs.

It is clear that with a contract carriage system no transporter can be obliged to construct new facilities, but the true differences between the two systems is more related to who is responsible for ensuring that 'desirable' developments take place, and who bears the costs and commercial risks arising from such developments. In gas transmission development, a contract carriage is likely to provide a level of development which is broadly as appropriate and efficient as common carriage, with the additional benefit of not requiring the granting of monopoly franchises to compensate for the additional risks. Where the government or other agencies require socially desirable facilities to be developed, this can still be achieved under contract carriage, with the relevant agency in effect providing subsidy by taking on the role of the contracting party for all or part of the relevant capacity.

Authorization of natural gas transportation and distribution

In the UK, the US, and other countries that have opted for independent regulation for the gas industry, no gas transportation or distribution network can operate without a licence issued by the regulator. An application for a licence has to be made, specifying the pipeline route and capacity, demand assessment and justification, source of gas supply, transport agreement with specific users, economic feasibility of the pipeline, financial capability of the applicant, methods of financing of the project, etc. Usually, on receipt of the licence application, the regulator calls for a public hearing where other interested and concerned parties have the opportunity of representing their cases. Before granting the licence, the regulator has to be satisfied that the proposed project is required in the public interest and that the project has been designed appropriately after taking into account the availability and demand for gas, both present and future.

The regulator may also check if the proposed pipeline will adversely affect any existing transmission system. If the regulator thinks that the capacity of the pipeline does not take possible future demand into consideration, it has the power to require enhancement of the capacity provided that the transporter is authorized to recover his additional costs. Such an arrangement presupposes that the regulator would have more knowledge about present and future demand than may be available to the entrepreneur who is proposing to put up the pipeline. The procedure for licensing has tended to be long drawn and expensive in certain countries. In India, the government is progressively doing away with licences and permits but the appropriateness of licensing for regulating the gas sector needs to be examined. The gas transporters/distributors may be required only to intimate the regulator before starting business so that safety and environmental standards could be enforced.

Unbundling of trading and transmission

Gas and transportation of gas are different services, and in many countries demands have emerged for pricing and contracting these services separately. Historically, it has been a common practice to jointly price these two different services (that is offer a 'bundled' service), but this widespread practice has tended to disguise the drawbacks. The recent trend towards dealing separately with the two services, commonly termed 'unbundling', has many advantages both for the consumer and the development of a country's gas industry. It allows more efficient pricing of the individual services, which in turn

- helps to ensure efficient fuel choice by consumers
- facilitates more rational decisions on location of large gas consumers
- allows a more accurate valuation of new gas fields
- permits greater transparency and competition in provision of both gas and transportation.

In the longer term, it is difficult to argue that unbundling of this sort should be resisted; to do so would be to ignore an important element of the energy policy, which has now been widely recognized internationally. This is particularly important in the Indian context where the major objective is to attract additional private investment which will enable more gas to be produced or imported.

Cross-ownership

Cross-ownership between distribution and transmission or trading is an area of some controversy. In essence, there is a trade-off between encouraging the greatest potential development of the industry and possibly limiting the ability of the regulator to effectively regulate the industry. If cross-ownership is permitted, there is a potential for qualified and relevant companies to diversify in the industry. At the same time, cross-ownership does provide the possibility for vertically-integrated concerns to engage in anti-competitive practices that may be difficult for the regulator to control. Though there are some arguments for prohibiting this form of cross-ownership, these are not strong enough in the Indian context.

Fixing of transportation and distribution charges

In UK, the regulator has unlimited powers to fix the transportation tariff provided it does not discriminate against or favour any class of people. The UK regulator has been fixing a cap on such tariff after allowing a reasonable RoR to the transporters (around seven per cent on replacement value of assets). The change in the prices over time is governed by the RPI-x (retail price index-x) formula which motivates the transporter to achieve efficiency gains. The transportation tariff should be published so that consumers cannot be discriminated against.

In the US, the law lays down that transportation tariff should be 'just and reasonable'. The regulator has adopted a reasonable RoR method of regulation, allowing around 12% return on the written value of the assets. Any change in the tariff account for incremental investment or cost has to be approved by the regulator. A tariff based on a reasonable RoR is open to the objection that it does not reward efficiency and cost reduction.

In Canada too, the law lays down that the transportation tariff should be 'just and reasonable'. However, the Canadian regulator has been encouraging voluntary agreements between transporters and consumers and has sparingly used the powers to fix up the transportation tariff. The regulator has published the *Guidelines on Negotiated Settlement* to help consumers and transporters conclude voluntary agreements instead of relying on regulatory intervention. The regulatory law in Argentina requires that transportation tariffs be fixed to allow an efficient transporter to realize a reasonable RoR, which is a return similar to businesses having comparable risks. However, the law recognizes that in the absence of bad faith, prices freely negotiated between independent parties shall be deemed to be fair and reasonable.

In the Indian situation, either the US/UK type of regulation, which is highly interventionist, or a system which regulates by exception has to be selected. In the near future, India's incremental gas supply will come from small marginal fields or imports of LNG (liquefied natural gas). The gas will be costly even at the landfall point and there will be little scope for transporting the gas over long distances. Accordingly, the transmission cost is likely to be small in proportion to the total cost to the consumer. Further, any saving on transportation cost is likely to accrue to the gas producer/importer who will be free to charge net-back prices. Such circumstances would support the case for a light-handed system where the regulator has the responsibility to facilitate transportation contracts rather than control the prices and other terms in all cases.

Regulation of liquefied natural gas sector

The UK Gas Act does not have any regulation for import/export of gas. In Mexico, import/export of gas is allowed subject to information being given to the regulator. The laws in the US/Canada/Argentina specifically provide for prior approval of the regulator for the import/export of gas. Korea and Taiwan, which import LNG, allow such imports only by public sector companies. Thus the entire sector is under government regulation. Japan, which consumes two-thirds of the LNG produced in the world, allows private imports of LNG. These are done mostly by the consumers themselves, the largest proportion of them being power-generating companies. Government approval for importing LNG is not required.

The import of gas/LNG will have implications for fuel security and also for the balance of payment position. There may be a need to accordingly devise a suitable regulation for this sector.

Open access

Mandatory open access means that the regulator should have the power to ensure that any spare capacity in a pipeline be offered on a non-discriminatory basis to anyone who wishes to make use of that spare capacity to transport gas. The regulator should also have the power to provide interconnection between existing lines and other lines, existing or new, so that spare capacity is utilized. In cases of dispute, the regulator fixes the transportation tariff to be charged.

Associated with the concept of open access is the concept of unbundling of services. In the UK, the transportation and sale of gas are separated by fully separating their accounts. In the US, no interstate gas transporter is allowed to sell gas.

Canadian law permits a gas transporter to sell gas, but the profits from the merchant sales are deemed to be a part of the transportation tariff. Mexican and Argentinian laws also require open access.

In all these cases, the transporter is required to offer spare capacity to intending users on terms and conditions that may be fixed by the regulator. Such a system continues to be strongly resisted in Europe where the variant of 'negotiated third-party access' has been tried without much success. In the Indian context also, the accounts in respect of gas transportation and merchant sales should be separated so that the consumers know how much they are paying for gas and how much for transportation. This would facilitate non-discriminatory pricing of transportation facilities and also voluntary agreements. However, provisions for mandatory third-party access may again discourage transporters and result in suboptimal pipeline capacity. Complete unbundling of services was introduced in the US and UK only after the industry reached an advanced state of maturity, and in Europe, it has not been possible to introduce the system as yet.

Pricing and allocation of natural gas

The prices of gas chargeable by the ONGC and OIL have been recently linked to the international prices of fuel oil. It is likely that the prices will be raised to a level of 100% parity with fuel oil in a period of five years. The prices of gas produced from medium fields developed through joint ventures are already at the level of 100% fuel oil parity. The developers of small fields have been given the right to market gas at negotiated prices. Exploration, production, and import of gas will be facilitated by allowing market driven prices for gas consumers and net-back prices to the producers/importers of natural gas or LNG. Under such a situation, it should no longer be necessary for the government to allocate gas to various consumers as it does at present. Gas producers/ transporters should be free to decide how much gas is to be sold to which customers.

Regulation of distribution networks

Interstate pipelines and high-pressure transportation pipelines could be regulated by the central regulator appointed by the central government and low-pressure local area networks could be regulated by state regulators appointed by the state governments. At present, such local networks are there only in Vadodara, Surat, Ankleshwar, Bharuch, in Gujarat and some towns in Assam and Tripura. Two more projects in Mumbai and Delhi and one in Agra/Ferozabad are under implementation. The likelihood of substantial expansion of this sector in the near future is small. In the circumstances, it may not be feasible for state governments to set up regulators financed from the licence fees realized from gas distributors. The central regulator could look after distribution networks also till there is a substantial expansion in the distribution sector.

For the existing distribution networks, the distributors could be given exclusive rights to sell gas to the domestic, commercial, and small industrial sectors within clearly demarcated areas. For future projects, such franchises could be granted through a process of competitive bidding.

The practice in Mumbai and Gujarat has been to charge gas prices related to the prices of alternative fuels such as LPG and fuel oil. The Gas Authority of India Limited has proposed the same pricing for the Delhi project. Market pricing should preferably be for gas related to the prices of alternative fuels than for cost-of-service regulation, which would be difficult and time-consuming.

J Sagar Associates,
New Delhi

Jyoti Sagar

Legal and regulatory framework for the oil and gas sector in India

---

The Kingdom of Heaven runs on righteousness but the kingdoms of earth run on oil.
(Ernest Bewin, Member, House of Commons, in a debate on the UK Oil & Gas Act, 1982)

Exhibit 1 *Existing legal framework*

1 Constitution of India
  - division of powers: centre and state

2 Oilfields (Regulation and Development) Act, 1948
  - onshore: exploration licences, mining licences, royalty

3 Territorial Waters, Continental Shelf, Exclusive Economic Zones and Other Maritime Zones Act, 1976
  - offshore: licence to explore and exploit

4 Petroleum and Natural Gas Rules, 1959
  - procedures for exploration licences, mining licences, and royalties

5 Petroleum Pipelines Act, 1962
  - easement rights, pipeline safety

6 Petroleum Act, 1934
  - storage, transportation – testing and refining aspects

7 Oil Industry Development Act, 1974 & Rules 1975
  - oilfield cess collected by central government
  - allocation of funds

8 Orders under Essential Commodities Act, 1955
  - price controls

9 Government is the sole regulator
  - advised by the Directorate General of Hydrocarbons (E&P), Oil Coordination Committee (refining and petroleum product pricing), Oil Industry Development Board (infrastructure), Petroleum Conservation Research Association (conservation of resources)

Exhibit 2 *Need for oil and gas regulator*

1 Emphasis on public–private partnership
  - liberalized economic environment
  - investment required by year 2002 is 35 billion dollars
  - certainty for investors

2 Multiplicity of authorities
  - over 3000 orders under the ministry

3 Lessons from other sectors
  - Telecom Regulatory Authority of India, Central Electricity Regulatory Commission

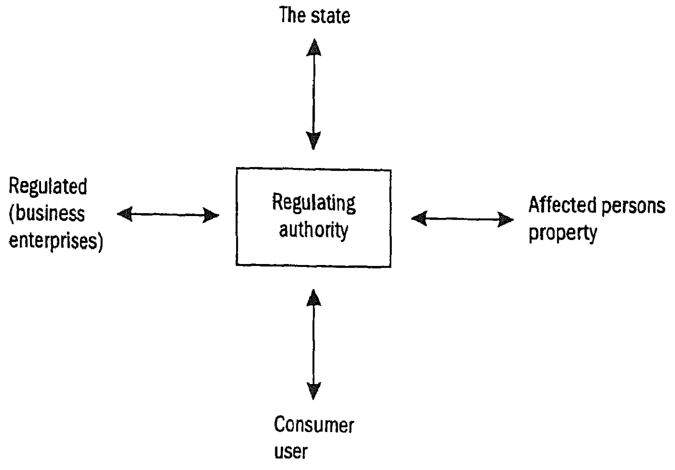
4 Balancing of diverse interests (exploration and production→transport→refining→distribution→user)
  - conflict of interest of various players

5 Resource conservation – sustainable development

6 Price stability in the face of monopolies

7 Safety and environment

Exhibit 3 *Role of regulator*



1 Exploration
  - grant authorization to collect samples prior to exploration licence
  - make rules and procedures for exploration activities

2 Development
  - drilling
    - approve drilling plans for environmental impact assessment
    - well density and direction wells
    - specify well completion requirements

- production
  - set standards such as production rate, choke size, and subsidence control
  - settle disputes relating to pooling
- safety and environment
  - specify procedures for prevention and control of blow-outs
  - specify procedure to prevent and control environmental contamination such as spills

3 Production refining interface
- parameters and grades for various products

4 Refining
- standards for product quality and quantity
- tariffs

5 Storage and transportation
- cost allocation for use of common infrastructure facilities
- more specific issues for gas
  - tariffs
  - safety and environment

6 Usage
- consumer protection
  - quality
  - price
  - competition and prevention of cartel formation
  - supplies to all areas of the country

Exhibit 4 *Suggestions*

1 Enact Hydrocarbon Regulatory Authority Act
- consolidate regulatory functions

2 Central and state legislation

3 Statutory autonomous body corporate

4 Constitution of the regulator
- full-time members
- chairperson: judicial background
- other members representing diverse disciplines
- panels/benches for specific sectors

5 Independence of members
- statutory appointment and secured tenure
- ineligible for government or private sector employment

6 Financial autonomy
- no reliance on government grants
- statutory allocation of funds out of cess/duties

7 Adjudicatory functions

- vested with powers of civil court regarding
  - summoning and enforcement of attendance of any person
  - examining any person on oath, issuing commissions to examine witnesses and/or receiving evidence on affidavits
  - reviewing its decisions
  - enforcing its decisions
- exclusion of jurisdiction of civil courts
- appeal to high court: fast track

'The legal framework in a country is as vital for economic development as for political and social development. Creating wealth through cumulative commitment of human, technological and capital resources depends greatly on a set rules securing property rights, governing civil and commercial behaviour and limiting the power of the state...' (World Bank 1994)

TERI,
New Delhi

R K Narang

Regulatory framework

Transition to a liberalized environment: experiences and issues in regulation 431-435

The oil industry in India has been under the government since 1976. The APM (administered pricing mechanism) based on the Oil Pricing Committee Report of 1975 has also been in operation since then.

As per the recommendations of the Oil Pricing Committee, the OCC (Oil Coordination Committee) was formed with the limited role of ensuring optimum positioning of crude at the refineries, distribution of finished petroleum products from the refineries, and management of pool accounts.

The role of the OCC has been expanded over the years and today it performs an important role for the oil industry as a whole and assists the MoPNG (Ministry of Petroleum and Natural Gas) in monitoring the implementation of their policies.

Regulated period

The role of the OCC during the regulated period can be broadly classified as under.

Role of the Oil Coordination Committee

Planning

Planning covers demand forecasting; expansion of existing, and creation of new, refining capacities at specific locations in the country; and creation of logistics infrastructure to enable optimum distribution of petroleum products to meet the demand at least cost to the pool accounts. The OCC assists the MoPNG and the Planning Commission in this regard. It formulates the annual oil economy budget, which helps the MoPNG in getting the approval of the Ministry of Finance for necessary foreign exchange allocation for imports/exports of crude oil and finished petroleum products.

Imports/exports of crude and finished petroleum products

The OCC ascertains the indigenous crude production from crude producers in India, and allocates it to the Indian refineries based on their processing configuration, requirement of finished product, and economics of refining. The OCC then works out the requirement of imported crude based on the refining capacity in the country, after accounting for the indigenous crude refining, refinery configurations, end products required, and economics of refining at each refinery. The OCC also works out the net crude/crudes (by type) and the deficit petroleum products to be imported, and the surplus petroleum products to be exported based on the crude/crudes processing in the Indian refineries, their yield patterns, and the demand forecast by product. This exercise is done for the whole financial year and sometimes revised in the middle of the financial year.

Optimum refinery operations

Since the APM ensures fixed returns to the refineries, it is incumbent on the refineries to operate at their optimum levels with best yields. The OCC fixes the standard product pattern for each of the refineries depending upon their capacity, units configuration, and crudes to be processed. The refineries have to meet the set standards. The OCC continuously evaluates the operations, crudes processed, and products produced by the refineries. This is reviewed every month at the Industry Coordination Meeting.

Coordination of supply and distribution

The OCC works out the country's demand for petroleum products for the month, for each consumption zone and pricing area. It also tables the products available from the refineries at the Industry Coordination Meeting. The OCC runs a computerized supply plan model along with the industry and finalizes the Supply Distribution Plan for the month at the Supply Plan Meeting. This Supply Distribution Plan works out the optimum distribution pattern of products for each of the refineries, depending upon the demand area by each mode of transport, i.e., sea, cross-country pipelines, railway tank wagons, road tank lorries, etc. The OCC monitors the implementation of the Supply Distribution Plan during the month to ensure that supplies are not disrupted and refineries do not face any dry out of crude or difficulty in product ullages/dispatches.

Managing pool accounts

The OCC keeps pool accounts under heads such as crude oil price equalization, cost and freight account, and freight surcharge account. It recovers the over-recoveries of oil companies under pool account head and reimburses them for under-recoveries incurred. This also helps the MoPNG in working out the rationale of pricing elements of petroleum products.

Management of crises

The OCC oversees the crude oil production, imports, refinery operations, and distribution of products to the demand centres on a regular basis. In case of any crisis arising out of political/natural disasters, breakdown in any of the refineries or distribution channels, external emergencies, etc., the OCC suggests solutions in consultation with the industry for the approval of the MoPNG to ensure smooth supplies of petroleum products in the country.

Management information system

The OCC has a very strong MIS (management information system). It has complete data of the past and there is a regular inflow of current data, which include crude production, transaction of imports, refinery operations, and distribution of products at each level. This enables the OCC to take prompt decisions. It has its own independent OILCOMNET through which the entire oil industry is wired.

regulated iod

In November 1997, the Government of India gazetted the deregulation of the oil industry by year. The process is going as per schedule. One has to visualize the roles of the companies, the regulator, the government, and the industry associations (if any formed) in a deregulated scenario and the relationships which would develop between them.

In a deregulated scenario, different functions of the OCC would be handled by different bodies. Planning for the entire country will be done by the Government of India and the regulatory body. As far as the companies are concerned, they will plan for themselves and take care of their own refining and marketing strengths and strategies.

Imports of crudes/products

The refining industry has been deregulated with effect from 1 April 1998. Each refinery will independently decide on its own crude processing and product patterns for optimum economics.

Optimization of refinery operations

The companies will themselves optimize their own refinery operations since this will affect their profitability.

Coordination of supply and distribution

Each company will have to ensure that it caters to the requirements of its customers to their full satisfaction and that it provides prompt supply at minimum cost. So each company will have to plan its supply chain independently or in association with other companies on a commercially-negotiated basis, to their optimum advantage.

Management of pool account

The pricing for all products would be deregulated. The companies would be obliged to meet the country's demand in all pockets including difficult geographical areas such as Ladakh, Andaman and Nicobar Islands, and Lakshwadeep. The companies may have to create their own pool accounts to ensure reasonable pricing of products in all geographical areas. The regulatory body will ensure that consumers of petroleum products do not suffer on account of shortage, poor quality, or overpricing.

Management of crises

The companies would be expected to perform their function in a crisis. The regulatory body will be required to intervene as and when the oil companies fail to meet the challenge or in case of a force majeure. The regulatory body, with approval from the Government of India, will have to direct the oil companies to tackle such situations.

Maintenance of the MIS

The regulatory body inherits the function of maintaining the MIS from the OCC. The past MIS will form a strong data bank for the regulatory body to take decisions and prepare its own appreciation of the situations. The current flow of the MIS would have to continue. The regulatory body and the oil industry may have to work on the classification of information, which will have to be mutually agreed upon, and decide what information will flow to the regulatory body and what will be retained by the companies as their trade information.

Role of the government

The government will have to deal with issue-related policies and give direction to the oil industry for the future. The policies will have to be laid down for the orderly functioning and development of the oil industry. The government will have to deal with the following issues.

- Overall policy for the oil sector in the field of refining, marketing, and distribution
- Tariffs on crude and products
- Subsidy for sensitive products, if required
- Allocation of superior kerosene oil to each state as long as the public distribution system continues
- Product specifications

- Safety, health, and environment
- Type of interventions, if required, in the marketplace and modus operandi with clearly prescribed roles for the regulator, oil companies, petroleum industry associations, etc.

Relationship between the regulator and the government

The regulator and the government would work in close coordination. The regulator would essentially ensure that the policy objectives of the Government of India are achieved in regulating the downstream oil sector. Thus, the regulator would derive its framework for regulation from the policy outlined by the Government of India. At the same time, it is expected that the regulator would be well placed to bring to the attention of the government the policy changes/interventions required to better safeguard the national and the consumer interests, product specifications, security stocks, supply–demand scenario, etc. The regulator would also coordinate with other regulatory bodies like Directorate General of Hydrocarbons, the OISD, and the Gas Regulatory Body laterally or through the government according to the need.

Relationship between the regulatory body and groups outside the government

In addition to coordinating with the government, the regulatory body will have to interact with the oil companies, consumers, and oil industry associations.

The regulator would need to interact closely with the affected groups, both when defining the rules and regulations for effective operation of the downstream petroleum sector and when determining the criteria and measures of efficiency. The regulator would also need to have constant feedback from the petroleum industry associations so that it can be responsive to the needs of the industry and interpret and influence policies as may be required.

Many other ministries of the Government of India would also be setting up policies that would influence the operations of the downstream petroleum sector. Most important of these would be the Ministry of Finance, the Ministry of Environment and Forests, the Railway Ministry, and the Ministry of Surface Transport. The framework for regulations should be within the policy guidelines provided by these ministries.

Oil Coordination Committee,
New Delhi

M S Ramachandran

Regulatory authority

Transition to a liberalized environment: experiences and issues in regulation 436-439

Exhibit 1 *Regulatory authority: background*

1 Energy is required for the economic, social, and industrial development of a country and for improving the quality of life of its people
2 Hydrocarbons constitute the single most important component of primary energy
3 Due to the strategic importance of hydrocarbons, the petroleum sector cannot be totally left to market forces
4 Increasing share of oil and gas in the total primary energy consumption (million tonnes of oil equivalent)

	1991		1996	
	Oil and gas	Total	Oil and gas	Total
India	71	184 (38%)	98	247 (40%)
World	4911	7808 (63%)	5284	8380 (63%)

5 Establishing an appropriate and robust framework is the key to a successful liberalization process
6 Three elements of vital importance are
- legal framework to ensure a secure environment
- regulatory framework to establish a level playing field
- industry restructuring to ensure realistic competition especially in sectors with natural monopoly

Exhibit 2 *Liberalization in the downstream petroleum sector*

1. Parallel marketing of liquefied petroleum gas, superior kerosene oil, and low sulphur heavy stock was allowed in February 1993
2. Import blending and marketing of lubes was totally decontrolled in November 1993
3. Petroleum products were increasingly moved to the Free Trade Products List
4. Price of high speed diesel linked to import parity, effective 2 September 1997
5. The government announced phased programme of deregulation over four years, effective 1 April 1998
6. A number of decisions implemented, effective 1 April 1998
7. By March 2002, the entire petroleum sector is planned to be deregulated

Exhibit 3 *Urgent need for a regulatory authority*

1. In the deregulated scenario, the government has to ensure
   - adequate availability at reasonable prices to meet the full demand of petroleum products
   - redressal of grievances and protection of consumer interest
   - settlement of disputes amongst different operators
   - compliance with prescribed rules by all players
2. An empowered and independent authority is required to be in place

Exhibit 4 *Basic objectives of the regulatory authority*

1. Safeguard consumer interest
2. Prevent cartelization and unfair trade practices and promote competition
3. Act as a monitoring, adjudicating, and recommending body
4. Promote investment in the petroleum sector
5. Make recommendations to the government on various policy issues

Exhibit 5 *Functions of the regulatory authority*

1 Monitor implementation of policies laid down by the government
2 Protect consumers' interests with reference to price, quality, and availability of products
3 Implement consumer protection measures and effective grievance redressal mechanisms
4 Regulate operation of facilities to promote efficient and economic functioning with common user facilitation on equitable terms
5 Settle disputes affecting consumer interest and better customer service between various players
6 Promote competition by encouraging investment by new entities
7 Promote fair trade and prevent cartelization and monopolies
8 Monitor and regulate tariffs of common usage facilities such as pipelines
9 Organize and maintain the information and technical data bank
10 Facilitate policy formulation that would further its objectives and provide an interface for interactions with other ministries / regulatory bodies on matters of common interest
11 Assist the government in the planning and development of the downstream oil industry activities and in the management of crisis situations as may be required

Exhibit 6 *Proposed structure of the regulatory authority*

1 The regulatory authority to consist of five members, including a chairman, to be appointed by the government on the recommendations of a selection committee
2 Every member can hold office for a period of three years, extendable further up to two years
3 It shall have an advisory committee to advice on major issues of policy
4 It shall have regional offices at such locations as may be found necessary

Exhibit 7 *Powers of the regulatory authority*

1 The regulatory authority shall have the powers as vested in a civil court, under the Code of Civil Procedure, 1908
2 All orders and directions passed by it shall be enforceable by law as if it were a decree passed by a civil court
3 It shall also have powers to impose fines and penalties
4 It shall have powers to direct an officer or a person authorized/charged with the responsibility under an Act/Rule governing downstream petroleum activities to lodge an FIR (first information report) with the police or direct the concerned police officer to register an FIR, or file a complaint with a criminal court for commitment of default by a person under this Act
5 Subject to the provision of the Arbitration and Conciliation Act, 1996, it shall have the powers to act as arbitrator or to nominate arbitrators to adjudicate and settle disputes arising between the entities

Prize Petroleum
Company Limited,
New Delhi

J M B Baruah

Need for an integrated regulatory authority for the hydrocarbons sector

Transition to a liberalized environment: experiences and
issues in regulation 440–442

Both the upstream and downstream sectors of the petroleum industry in India have been operating under a protected environment where the government determines the business portfolio of the public sector undertakings, allocates capital for investments, determines production quotas, and decides both producer and consumer prices to ensure profitability at a predetermined level. With the liberalization of the economy, and more specifically the oil sector, this protected environment will change drastically.

The petrochemicals sector has been operating in the free market environment for some time as far as marketing of petrochemical products is concerned. However, feedstock and fuel prices were based on the APM (administered pricing mechanism) applicable to the petroleum sector.

This worked well as long as import duties of petrochemical products were ruling at a high level of around 100%. But, progressive reduction in import duties to 10%–35% during the last five years has considerably eroded the profitability of the petrochemicals sector. Since 1995, the price of various petrochemical products started dropping in the Indian market. The effective devaluation of the Indian rupee vis-à-vis the major foreign currencies also did not help as the global price of petrochemicals also started dropping since 1996 as a result of overcapacity.

Meanwhile, the East and the South-East Asian regions which are known for growth rates of around 10% for petrochemical products, and where several plants manufacturing world class petrochemicals are located, plunged into an economic crisis. This resulted in a sharp drop in the local demand for these products. The excess availability of products in this region along with the loss in value of the local currencies of countries like Indonesia, Thailand, and Malaysia, resulted in increased import of cheaper petrochemical products to India. Most petrochemical companies, except for giant players like Reliance Industries and Indian Petrochemicals Ltd, started showing major losses, and many new projects were either abandoned or deferred. Except for the few giant players, only those companies having a vertically-integrated business portfolio could face the onslaught.

Also, the pricing of refinery products like naphtha and fuel oil used as feed or fuel in the petrochemical plants was deregulated. The response to the market force has been the downward revision of prices of these commodities. This correction has resulted in some positive impact in the competitiveness of the Indian petrochemicals industry.

A situation similar to that in the petrochemicals industry occurred in the oil companies operating in the upstream E&P (exploration and production) activities with the exception of the two national oil companies – the ONGC (Oil and Natural Gas Corporation Limited) and OIL (Oil India Limited). Thanks mainly to the OCC (Oil Coordination Committee), a floor price for crude oil has been fixed at the level of the earlier APM-based price for both OIL and the ONGC, thus insulating them from the sharp fall of international prices. The sharp drop in the crude oil price would make the running of a number of small and marginal oil fields uneconomical because of a higher cost of production. In the process, the viability of some of the small oil companies which are primarily in the small or marginal fields becomes questionable. This would also act as a deterrent for other new players to venture into the E&P business.

The question is whether something can be done to alleviate the situation under the deregulated post-APM environment. This is where regulators have to play an important role. Perhaps the fiscal regimes associated with the development and production of the small and marginal fields should be treated in a different manner as has been the case with exploration of frontier basins like deep water basins. It may also be necessary to provide fiscal incentives like reduced excise duties for refineries meeting at least a part of their crude requirements from small or marginal fields. The twin objectives would be to reduce the cost of production of the small and marginal fields to a level nearer to that of larger fields and to permit these small or marginal field crude oil producers to charge the refineries a higher price for the crude supply.

The next obvious question is what should be the criteria to decide which fields qualify for the special fiscal regimes. These could include the size of the field in terms of recoverable reserves, individual well productivity, maintenance of reservoir pressure at a predetermined optimum level spelt out in the development plan, and the distance between the field and the existing infrastructure.

The independent regulator should have the authority to decide the applicability of these or other such incentives. Other important functions of the regulatory body will be to ensure adoption of good oil industry practices, optimum reservoir management, and meeting of various environment, safety, and health-related standards.

As per the latest model PSC (production-sharing contract), the Ministry of Petroleum and Natural Gas would be one of the parties to the petroleum sharing contracts and the members of a consortium of oil companies would be the other parties. Accordingly, the representatives of the ministry would be members of the management committees for petroleum operations under the PSCs. The regulator, who would have wide-ranging authorities, may need to be an independent body of the government representing various ministries including finance, commerce, industry, environment, and labour, law.

The Petroleum and Natural Gas Rules, 1959 provide for the state government to be the authority to grant exploration licences and mining leases in respect of blocks located in respective states. For smooth execution of the provisions of the PSCs, it would be desirable to have the state governments adequately represented in the central regulatory authority so that the oil companies would not have to deal with multiple authorities in respect of conduct of petroleum operations in the country.

With more companies becoming integrated to minimize risk of exposure to price volatility, there should be a common regulatory authority to cover the entire spectrum of the petroleum industry including upstream E&P of crude oil and natural gas, transportation of crude oil and natural gas, downstream refining and marketing operations, and use of infrastructure such as pipelines and ports.

Petronet LNG
Limited,
New Delhi

R P Sharma

Implementation of a regulatory framework: the Indian gas industry

Transition to a liberalized environment: experiences and
issues in regulation 443-449

Objectives of a gas regulatory framework

Since natural gas is likely to play an important role in the energy sector in the country, it is necessary to develop a regulatory framework for the gas industry for its structured growth. The MoPNG (Ministry of Petroleum and Natural Gas) is accordingly taking action for the formulation of a regulatory framework for the Indian gas industry. The important factors that need to be taken into account for such regulations are safety, creation of a favourable environment for growth, prevention of monopolies, consumer protection, stability, level playing field, resolution of dispute, and promotional role.

Based upon these factors, the objectives of gas regulation could be to

- promote the expansion of gas transportation and distribution network in the country
- protect the gas consumer by ensuring that supply is made on non-discriminatory terms and conditions, continuity of supply is maintained, and the quality of supply is assured
- ensure economic efficiency in the transportation and distribution of gas.

Producers

The ONGC (Oil and Natural Gas Corporation Limited) and OIL (Oil India Limited) are the major producers of natural gas in the country, though lately about 7 million standard cubic metres per day of natural gas is also being produced through joint ventures between the ONGC (which has 40% equity stake) and the private sector and multinational companies under production-sharing contracts from Mid Tapti, South Tapti, Panna-Mukta, and Ravva gas fields. More fields are expected to come under the production-sharing contracts. Besides, the NELP (New Exploration Licensing Policy) proposes to offer several other blocks to national, public and private sector companies, and multinational companies under the competitive bidding process.

Demand-supply balance

The current production of natural gas is 70 million standard cubic metres per day and it is fully utilized. It is likely to increase to 85 million standard cubic metres per day by the end of the Ninth Five-Year Plan. However, allocations already made exceed the projected availability and the demand has to be met through alternative sources till gas is made available either through extensive exploration / developmental activities within the country or through import of natural gas through pipelines or in the form of LNG (liquefied natural gas).

Presently, GAIL (Gas Authority of India Limited) handles the distribution of over 95% of the gas produced in India. Its existing distribution network has the capacity to handle gas being produced from domestic sources as well as the marginal additional quantity that may become available by the end of the Ninth Plan. However, the development of a substantial additional T&D (transmission and distribution) infrastructure would become necessary if considerable discoveries are made through exploration and developmental activities in the country, including the high expectations of gas available from deep-sea, or if a substantial quantity of gas is imported.

The demand–supply gap as estimated by the expert group appointed by the government is listed in Table 1.

Supplementing gas through import

As the projected gap between the demand–supply potential is large, India had explored the possibility of importing gas from the Middle East through pipeline, but unresolved technical and political issues have hindered the progress. The possibility of importing gas from Bangladesh, however, provides an opportunity for the development of import facilities in the eastern sector and efforts are being made in this direction.

Liquefied natural gas is a technically and economically well-established route for importing natural gas. The Government of India has approved the formation of a JVC (joint venture company), - Petronet LNG Limited - with GAIL, ONGC, IOC (Indian Oil Corporation), and BPCL (Bharat Petroleum Corporation Limited) having a total of 50% equity;

Table 1 Gas demand-supply gap (million standard cubic metres per day)

	1999/2000	2004/05	2009/10
Gas demand	146	188	283
Gas supply (after internal consumption, etc.)	68	68	68
Gap	78	120	215

the balance equity is to be offered to institutional investors and others. The JVC is in the process of developing LNG import terminals in Dahej and Kochi. It will identify more locations to meet the demand of LNG more so in southern India to provide a base for the southern gas grid. Liquefied natural gas has been placed on OGL (open general licence). Besides, the Foreign Investment Promotion Board and the Cabinet Committee on Foreign Investment have given clearance to a number of proposals like Enron in Dabhol, British Gas in Pipavav, HPCL-TOTAL in Vishakhapatnam, Shell in Hazira, Ispat Group in Kakinada, Reliance Industries Limited in Hazira/Jamnagar, etc. Apart from heavy investment in the LNG chain, investment is needed in the T&D network as well as in downstream utilization. Petronet LNG Limited (formed on 2 April 1998) has already signed a memorandum of understanding for the purchase of 7.5 million standard cubic metres per day of LNG from RasGas, perhaps the single largest contract entered into for purchase of LNG.

The introduction of new players, if handled effectively, would result in healthy competition and growth of the industry. Competition will be fostered by the entry of private sector industries, resulting in larger investment in the non-government sector. Thus, a scenario may emerge when a number of players would be operating in the management of a demand–supply balance.

With regard to the natural gas sector, no legislation exists as yet. Since there are limited players in production and distribution of natural gas (and those too public sector companies), the MoPNG has been regulating certain aspects of natural gas markets through various orders and notifications from time to time covering policy on allocation of gas, pricing, and safety. Regulation is being done through various wings of the ministry and its departments. Since the number of players in the gas industry is increasing, it is necessary to consider the formulation of a gas regulatory framework. As increase in the availability of gas from the domestic sector is likely to be limited, the main supplementing source is likely to be through import of LNG. This aspect needs to be considered in the proposed regulatory framework. Therefore, it may perhaps be desirable to look into the models being adopted in Japan (the largest importer and user of LNG in the world) and Korea (the latest entrant in the LNG field with substantial consumption in the Asian market). (Taiwan is the latest entrant, but its consumption is limited.) It will be more relevant to develop natural gas regulations in India on the pattern of Asian countries instead of basing it on the regulatory framework applicable in the West where the gas consumption pattern and priority of gas utilization are different.

Japan In Japan, the gas industry is controlled by MITI (Ministry of Internal Trade and Industry). Approval from MITI is required for plant location and construction of LNG terminals. There are other government departments for approving issues of environment, port and harbour, etc., but approval from MITI is required when gas production/storage facilities or a pipeline is newly established or renovated. MITI regulates the consumer price of gas, and any rise/reduction in the gas price by the gas companies is to be approved by it. MITI is assisted by several advisory committees and councils consisting of professors, representatives of consumers, etc., to investigate important matters relating to the gas industry such as deregulation, aiming at economic efficiency in the industry, and protection of consumer interests.

Korea Korea has adopted a modified system of the Japanese structure for its gas industry. LNG was first imported to Korea in 1986. The Korean government was involved at every step of LNG development from the feasibility study to promulgating regulations to ensuring sufficient demand and buyers' creditworthiness. One of the first objectives of the government was to create a creditworthy buyer of LNG, namely KOGAS (Korea Gas Corporation). KOGAS was designated as the sole importer of LNG and wholesaler of gas to power plants and city gas companies. It also assumed the role of owner and operator of LNG receiving terminals and the gas transmission network, as well as responsibility for R&D in gas. The government energy policy seeks to achieve the following objectives.

- Secure a stable supply energy source
- Enhance efficiency of energy consumption
- Promote the use of environment-friendly energy
- Participate in and develop foreign energy projects

The success of a rapidly growing LNG business in Korea can be attributed to the following three factors.

1 KOGAS's strong financial position
2 Strong regulatory environment provided by the Ministry of Trade, Industry and Energy by way of a pricing framework which ensures KOGAS a reasonable rate of return
3 Korea's limited energy source, giving a strong market for LNG

These characteristics have made Korea an attractive market for suppliers and lenders alike and enable KOGAS to purchase LNG without a sovereign guarantee. It is interesting to note that KOGAS's financial position has been strong enough to support the recent grass-roots development of Oman and RasGas LNG projects as financial closure of both plants have been achieved on the basis of the purchase commitment of KOGAS. It could also negotiate the contract, which has no floor price or a ceiling advantageous to the buyer in low oil price situations.

The ministry's involvement extends beyond regulating prices. It is involved in all major KOGAS import decisions and holds final approval authority over all LNG purchases. It is also the policy of KOGAS to maximize local construction work, equipment purchases and operation, and localization of LNG carriers. Since the Korean shipping industry is well developed, localization of LNG carriers is accomplished by insisting LNG purchases on FOB (free on board) basis. KOGAS supplies LNG to KEPCO (Korean Electric Power Company) and 14 city gas companies in South Korea. KEPCO uses LNG for power generation and city gas companies sell natural gas to consumers in the commercial, industrial, and residential sectors.

The strengths and weaknesses of the structure are outlined in Table 2.

These strengths and weaknesses have lately been evaluated by the Korean government which is considering privatization of KOGAS and liberalization of the LNG import, though no details have yet been prepared or approved. However, it is believed that this would allow private companies as well as some state-run gas/power utility companies to buy LNG directly from the seller in the near future. Korea is now moving to privatize a portion of its gas and power industries by

Table 2 Strengths and weaknesses of the Korean structure

Strengths	Weaknesses
Strong government support Ease in managing nationwide construction work Integrated single invoice in sale/purchase Strong negotiating power Ease in securing finance	No competition Low service quality Very little flexibility in decision-making and bureaucratic operation

(1) developing additional infrastructure (more capital is needed and private investors are a proven source); (2) privatization leading to competition, thereby improving cost and operations; and (3) developing the skill of Korean firms so that they can grow internationally.

Though only one company is responsible for the import of LNG, a number of Korean government authorities are performing the functions of regulatory authorities in their respective fields.

- The Ministry of Environment regulates fuel usage, emissions and pollution.
- The Ministry of Finance and Economy regulates the price and provides funding and tax incentives.
- The Ministry of Trade, Industry and Energy formulates laws and regulates control of supply and demand, and oversees major activities of KOGAS and KEPCO.
- The provincial government regulates activities of city gas companies and business licence and construction permits.

Suggestions for India

In India, pending the formulation of a gas regulatory authority, the MoPNG which is already performing regulatory functions specially in respect of public sector companies may assume the role of the Ministry of Trade, Industry and Energy in respect of public sector undertakings and other parties. In the meantime, a regulatory framework for gas can be systematically developed for introduction through the appointment of a gas regulatory authority.

Need for gas regulation

A regulatory framework that ensures the structured growth of the natural gas industry in the country would provide for an environment where there is

- no unhealthy competition
- no redundancy in existing capacity and avoidance of idle capacity build-up
- protection of consumer interests
- a check on import cost
- a tool to promote investments
- norms for safety of terminals, installations, and pipelines.

To achieve the above, it is necessary to know how much to regulate and what authority is to be given to the regulator.

- Though the regulator may not have the authority to fix the price it has to play an important role in pricing by laying guidelines and limits for import cost. Even an additional cent costs the economy over $500 000 per million tonnes per annum of LNG import.

- The regulatory authority has to create a favourable environment for investment in developing the natural gas industry on an all-India basis so as to avoid regional imbalances.
- The regulatory authority needs to be a statutory authority but pending authorization, the MoPNG can treat the authority as its extended arm for implementation of the gas regulatory framework by passing its power and authority to the regulator.

While openness and competition are welcome concepts, the regulator has to see that regulatory measures should not result in disincentives to investment, creation of idle capacity, and additional costs to the consumers.

Reliance Petroleum Limited, Mumbai

P Raghavendran

Oil marketing reforms: concerns

Transition to a liberalized environment: experiences and issues in regulation 450-452

Exhibit 1 *Road map to marketing sector reforms*

1 Freedom for refineries to enter into commercial bilateral agreements for product swap and purchases
2 Pipelines to be declared common carriers. Pipeline companies free to sell their capacity to other refining/ marketing companies and end-users
3 Freedom for refining and marketing companies to construct pipelines either as part of Petronet or independently for captive use
4 Freedom to put up terminal facilities linked with cross country pipelines/ports
5 Separate terminalling charges on normative basis for existing and new terminals

Exhibit 2 *Response to potential areas of concern*

Concern	Response
Basis for pipeline throughput charges	▪ Standard throughput charge: 70% of notional railway freight from the nearest port ▪ Rationale • compensates additional cost of road/rail movement from tap off point to a secondary market versus direct movement • consumer benefits from the lower cost of pipeline transportation
How will crude and refinery gate prices be determined for inland refineries?	▪ Target at 70% of notional railway freight from landfall point for crude

Concern	Response
	and products to cover cost of pipeline transportation as long as marketing remains regulated ■ Ensure smoother transition to a free market, when rates are expected to settle at these levels
Price in far-flung areas will increase with market deregulation	■ Direct transparent subsidies could be provided for special cases such as the North-East and Jammu and Kashmir ■ Similar to cement and steel, where removal of freight equalization did not lead to major market upheavals
If a refinery, during transition period, produces more than its hinterland demand, who will bear the cost of movement to coastal locations or exports?	■ Since refineries do not have marketing rights, the consequential under-recoveries should be borne by the pool or shared by all refineries in proportion of production
If a refinery in a free market situation produces more that its hinterland demand, who will bear the cost of movement to coastal locations or exports?	■ A refiner bases his choice of location on the assessment of demand and should therefore bear the under-recovery on coastal movements or exports. This principle will lead to efficient location of refineries and optimization of capacities
Prevention of scarcity	■ In a free market situation, one or more marketers normally ensure that supplies reach all demand centres, however remote

Concern	Response
	▪ The regulatory authority can intervene if there is inadequate competition and profiteering by the existing players ▪ Price increase due to higher logistics costs should be covered through directly targeted subsidies, if required
Ensuring quality of product and services	▪ Free market rewards higher quality ▪ Artificial control through policing less effective ▪ Role for regulatory authority if competition is inadequate in a product or region

TERI,
New Delhi
R K Batra

Market issues

Transition to a liberalized environment: experiences and issues in regulation 453-455

The market structure in the oil and gas sector is influenced by the government, regulator, oil and gas companies, and the consumer.

Promoting and facilitating market players

Promoting and facilitating market players is essentially the role of the government. This is because the government enunciates the hydrocarbon policy for the country. During 1976–96, the government operated a closed-door policy due to which the market players were basically all the PSUs (public sector undertakings). With the announcement of a four-year programme for dismantling the APM (administered pricing mechanism), more and more players are coming in. The area of lubricants which has about 30 players has been totally decontrolled. Though it is a level playing field, intense competition is likely to force some of the players out of business. This may result in some change in the marketing strategy of the PSUs. Bazaar operators are causing concern, but at least one multinational (Castrol) has followed this channel very successfully for many years. Hence, there is no reason why the PSUs should not think in terms of altering their marketing channels.

The other matter of concern is that some of the new players are really old wine in new bottles. Petronet India and Petronet LNG are basically the same (PSU) players. There is no new player other than Reliance Petroleum Limited into building pipelines. The Railways is not participating in the new pipeline systems. If an offer were made in a reformed system with an independent regulator in charge, what would the reaction of the regulator have been? Perhaps the Railways would have participated. The Railways is not merely in the business of running trains, it is in the business of transportation. If there is an alternative means of transportation that will result in revenue loss for the Railways, rather than opposing every pipeline project that has come up over the previous years, it could plan investments in the alternative mode to recoup the losses. The PSUs have suffered more than anybody else because of stringent opposition from the Railways to some projects, for instance, the Mumbai–Manmade pipeline took many years to get through the Public Investment Board. However, Reliance Petroleum Limited which is putting up a pipeline has not been opposed by the Railways. The government has a key role in promoting and facilitating market players, and in creating a climate so that oil companies are willing to enter the market.

Market share

A predominant market share could act against the interest of consumers. In such a situation, the regulator has to make sure that no company has a predominant market share if it works against the interests of the consumer. This is because a high market share could result in the particular company cornering the market or the market becoming vulnerable to the fact that there is only one supplier. In some countries, maximum limits with respect to the market share are specified. However, given the current dominant position of some PSUs, this may take some time to implement.

Quality of services

The primary responsibility for quality of services, particularly in a competitive environment, would be that of the oil or gas company. In fact, the oil or gas company will be driven to provide quality services. In a deregulated system, the consumer will insist on a particular standard of service which he has not been able to do anything about in the past.

The PSUs have been handicapped by the fact that their frontline or point of sale is run by people in whose selection they have contributed little. Whether it is the liquefied petroleum gas distributor or the motor spirit and high speed diesel dealer, selections are made by the Oil Selection Board. There are categories for freedom fighters, physically handicapped persons, etc. This does not contribute to providing optimal service to the customer. The person selected must essentially be either a businessman or have the necessary business attributes and financing to run these outlets, as the average customer comes into contact with the distributors and dealers and not with the officers of the oil company. Therefore, to ensure the required quality of services there should be a total change in the selection procedure and selection boards of oil companies, dealer selection boards, norms for retail outlets, categorization, reservations, etc., will need to be done away with.

Quality of products

The quality of products too, is essentially the responsibility of the oil and gas company. So far, the consumer has not had much choice. For example, the Singapore refineries are in a position to blend virtually any grade of gasoline required. They are export-oriented, but this example illustrates that for far too long the consumer has had to be satisfied with whatever products are supplied to him. Under a reformed system, if the customer (whether a car manufacturer or an industrial unit) wants a particular grade of petrol or fuel oil, he should be able to ask for it and refineries will have to adapt to making blends to suit individual consumers. Another problem is that a large amount of kerosene goes towards adulteration of diesel. This is because the subsidy on kerosene is provided at the front end. As subsidies on kerosene cannot be done away with, some innovative measures must be found by which the subsidy on kerosene is given not up front but at the 'end-of-pipe' of the system. Thus, at any intermediate point, anyone who wishes to use kerosene for adulteration of diesel has no incentive because the pricing is almost the same.

Third-party access

Fair and patent rules are necessary to allow common access for pipelines. If there is common carriage, then people who are likely to use the pipeline will invest in the pipeline itself. But pipelines are not the only natural monopoly. For example, if someone buys a plot of land in a port area and prevents another person from putting up a terminal, this acts as a natural monopoly. Not only should there be sharing of pipelines but there should also be sharing of coastal refinery tankages for anybody wanting to import kerosene.

Others

Remote area supplies, security of supplies, fair price/charge, and prevention of scarcities are other components of the market structure.

Remote area supplies

The regulator will have to play a key role in ensuring that oil companies make their products available in remote areas. At the moment, the regulator has a role to play as airlines do not want to fly uneconomical routes.

Security of supplies

The government has a key role to play in the protection of offshore installations, ensuring that India's sea lanes are protected.

Fair price/ change

The regulator will need to have some system in place by which prices are monitored (regional offices, online information systems, etc.), which will keep the regulator informed about the developments in various parts of the country.

Prevention of scarcities

The regulator must have a system in place to monitor the developments. The government and oil companies also have a complementary responsibility.

Bharat Petroleum Corporation Limited, Mumbai
S Behuria

Market structure after deregulation: promoting competition among public sector oil companies

Transition to a liberalized environment: experiences and issues in regulation 456-463

Exhibit 1 *Salient features of the petroleum market before deregulation*

1 Marketing companies reimbursed their operating expenses and a post tax return of 12% on investments in the marketing network
2 Plans for infrastructure development prepared on industry basis and approved by the Ministry of Petroleum and Natural Gas. All facilities are treated as industry facilities
3 Sales targets fixed for each company as per the supply plan entitlement formula; excess margin shared among oil companies
4 The cost of petroleum products to a marketing company is fixed irrespective of the source and is uniform across locations
5 Marketing companies have product exchange agreements through purchase–sale, hospitality arrangements, loan transactions, etc.
6 Retail marketing network planned by the government annually. Selection of dealers and distributors through the Oil Selection Board
7 Targets for enrolment of LPG (liquefied petroleum gas) customers, kerosene quotas, commission payable to dealers/distributors fixed by the government
8 Product movement to locations as per the Monthly Industry Supply Plan
9 Pricing of products determined through the APM (administered pricing mechanism)

Exhibit 2 *Key policy initiatives taken so far in deregulating the market*

1 Adjusted import parity pricing of HSD (high speed diesel) introduced
2 Prices of wax, bitumen, naphtha, FO (fuel oil), and LSHS (low sulphur heavy stock) decontrolled in 1998/99
3 Except for MS (motor spirit), HSD, ATF (aviation turbine fuel), SKO (superior kerosene oil) (for PDS [public distribution system]), and LPG (for domestic), all other products have been decontrolled w.e.f. 1 April 1998
4 Except for crude, MS, HSD, ATF, and natural gas liquids, imports/exports of all products decanalized w.e.f. 1 April 1998

Exhibit 3 *Likely policy directions in deregulating the market up to 2001/02*

The downstream sector to be totally deregulated w.e.f. 1 April 2002

1 Companies owning and operating refineries with investments of at least 20 billion rupees or producing 3 million tonnes of crude oil per annum to be allowed to market transportation fuels
2 Movement towards international parity prices
3 Freight and other under-recoveries to be passed on to end-users

Exhibit 4 *Impact of deregulation on marketing of petroleum products*

1 Emergence of new players will result in increased competition with emphasis on brand building and customer service
2 With domestic prices linked to import parity, the costs may increase/decrease depending on international price fluctuations and inflationary pressures
3 With the phasing out of subsidy on LPG, private LPG marketers would start competing with PSU (public sector undertaking) marketers on level grounds

Exhibit 5 *Issues and challenges in liquefied petroleum gas marketing*

1 Supply has been the biggest constraint in the growth of LPG demand. Compounded annual growth rate of 12.5% expected in future subject to new refineries fructifying and import infrastructure being in place
2 Retail sales of LPG are currently 97% of the LPG consumption
3 The government allowed parallel marketing of LPG since 1993. The price charged by parallel marketers is about 75% higher than that by PSUs
4 Growth of parallel marketers is hampered due to inadequate import handling and storage facilities
5 Parallel marketers are merely servicing the waitlisted customers of PSU marketing companies
6 On removal of subsidy on LPG, parallel marketers will have the incentive to invest in creating import handling infrastructure
7 Automotive use of LPG will be an exciting and challenging opportunity

Exhibit 6 *Issues and challenges in lubes marketing*

1 The lubes market in India of 1.2 million tonnes in 1997/98 makes it the sixth largest in the world, with a growth of 17% per annum during the past four years
2 Base oil imports have been decanalized since 1993 and the customs duty lowered from 85% to 35% progressively
3 The quality of lubes has improved with the introduction of multi-grade and synthetic lubricants produced at state-of-the-art blending plants
4 Automotive lubes account for 60% of the market
5 The number of players has increased from 5 in 1993 to 40 in 1997. The share of PSU marketing companies has declined from 88% in 1991/92 to 60% in 1997/98
6 The above changes in market shares are due to introduction of new products, aggressive advertising, and pricing. Marketing costs are estimated at 10% of the selling price of lubes
7 The PSU oil companies are laying greater emphasis on improved customer focus, targeting original equipment suppliers and bazaar trade

8 The other marketing challenges in lubes marketing are
- higher dealer commissions eroding margins
- shift from retail outlets to bazaar trade, requiring change in sales strategy
- market size determined by price
- phasing out of 2-stroke engines
- Indian customers' insistence on 'value for money'

Exhibit 7 *Issues and challenges in superior kerosene oil marketing*

1 Consumption of SKO has slowed down over the years mainly due to a shift towards LPG in the households. This trend is expected to continue
2 Growth in consumption is also driven to an extent by adulteration of HSD with SKO
3 Imports by parallel marketers increased from 0.5 million tonnes in 1996/97 to 1.2 million tonnes in 1997/98
4 The deficit in SKO availability is expected to be eliminated by 2000/01 with increased domestic production. The surplus can be downgraded to HSD

Exhibit 8 *Marketing challenges in distribution infrastructure development*

1 High cost of new infrastructure
2 Existing infrastructure to become redundant in some places with changes in product pricing
3 Access to cross-country pipelines to pose problems unless the 'common carrier principle' is introduced
4 Port infrastructure is inadequate, warranting huge investments
5 Road infrastructure being saturated, road transportation is inefficient and unsafe

Exhibit 9 *Marketing challenges in direct trade*

1 Price cutting by competitors
2 Stringent product specifications to warrant a higher price
3 Demanding customers seeking low input costs
4 Collection of outstandings from customers may result in slow accruals
5 Inter-fuel substitution (liquefied natural gas, natural gas, etc.)
6 Trade-off between high inventory costs and stock-out costs

Exhibit 10 *Marketing challenges in retail trade*

1 Dealer margins poised to rise, resulting in tight margins
2 Product margins would fluctuate as determined by the market
3 Customer service – the key discriminator of the future – should be of international standards
4 Right quantity and quality to be assured

Exhibit 11 *Role of the government after total deregulation*

1 The government would continue to own the responsibility to ensure adequate availability of petroleum products to meet full demand at reasonable prices in all parts of country. Towards this end, the government will formulate policies and framework for growth of the petroleum industry
2 Framing of overall policy for the oil sector
  - tariffs on crude and products
  - subsidies on sensitive products
  - product specifications
  - allocation of kerosene
  - issues of health, safety, and environment

Exhibit 12 *Regulatory authority for the deregulated oil sector*

1. The regulatory authority will be independent and quasi-judicial
2. It aims to protect consumer interest, provide grievance redressal, and promote healthy competition and balanced growth of the oil industry in India
3. The regulatory authority will
    - ensure compliance with government policies and guidelines
    - protect consumer interest by ensuring that the market remains competitive
    - maintain a strong management information system

Exhibit 13 *Petrofed: a voluntary, self-regulatory body of the oil industry*

1. Serves as a common platform to facilitate product exchange, hospitality arrangements, etc., between members
2. Interacts with the government and the regulator on all common issues
3. Ensures compliance with agreed industry supply plan and with agreed common guidelines relating to quality, safety, pollution control, customer relations, stake holders' relations, etc.

Exhibit 14 *Security of supplies and prevention of scarcity are vital to the economic life of the nation*

1. Oil security entails
    - development of long-term policies to avoid situations where a limited disruption of supplies can do serious damage
    - mitigation of the consequences, should a disruption occur
2. Maintenance of strategic reserves for MS, HSD, and SKO is suggested as under
    - 30 days cover to be developed between 2001–05
    - 60 days cover to be developed between 2006–10
    - 90 days cover to be developed beyond 2010
3. There must be a mechanism for reimbursement to oil companies of the huge investments required in infrastructure development and inventory holding

Exhibit 15 *Threats to the national oil companies in retail marketing*

1 Notwithstanding the immense competitive edge presently enjoyed by PSU marketing companies in terms of marketing infrastructure, there could be new threats from private marketers/multinational companies
  - retail marketing of inferior products akin to petroleum products may erode PSU market shares
  - possible takeover of dealer-controlled retail outlets by new players at exorbitant costs
  - cartelization of big marketers to the detriment of smaller players

Exhibit 16 *Oil public sector undertakings need enhanced autonomy in marketing to have a level playing field*

1 The recent conferment of the *navaratna* status on select oil PSUs is a major step in preparing the national oil companies for the challenges of deregulation and globalization

2 Additionally, oil PSU boards should have autonomy for approval of investments in joint ventures. Current restrictions in this regard in the *navaratna* package should be removed

3 To provide oil PSUs a level playing field with private and multinational oil companies, the boards should be vested with enhanced authorities particularly in the area of marketing

4 Authority for the following marketing activities should vest with the board
  - retail marketing
    - network expansion of new retail outlets, LPG distributors, etc.
    - selection of dealers/distributors
    - re-sitement of existing retail outlets
    - de-leasing of sites
    - retailing of non-PDS SKO
    - dealership agreement terms to include income share from non-fuel offerings at company controlled outlets and distributorships
  - direct trade
    - terms of supply of all deregulated products
    - setting up of consumer pumps for all categories of customers

- pricing
  - recovery of full delivery costs on MS/HSD supplies to retail outlets
  - recovery of full delivery charges on LPG cylinders
  - pricing of products for all end-users

Exhibit 17 *Charting the path for growth in the new millennium*

1 Oil PSUs have already initiated a comprehensive analysis of the existing corporate structures, of the threats and opportunities for business in the new environment, and of the strategies to develop and strengthen their competitive advantage

2 The recent conferment of the *navaratna* status on select oil PSUs will enable them to chart their own courses to become world-class corporate entities

3 PSU oil companies look forward to the future with confidence in their ability to take on the new challenges

Indian Oil Corporation Ltd, New Delhi
S N Jha

Market structure

Transition to a liberalized environment: experiences and issues in regulation 464-467

Exhibit 1 *Major activities in the oil industry*

1 Exploration of crude oil
2 Refining
3 Transportation of crude oil and petroleum products
4 Marketing of petroleum products

Exhibit 2 *Existing market players*

1 Exploration of crude oil
  - ONGC (Oil and Natural Gas Corporation Ltd)
  - OIL (Oil India Ltd)
  - Enron Oil and Gas India, Ltd

2 Refining
  - IOCL (India Oil Corporation Ltd)
  - BPCL (Bharat Petroleum Corporation Ltd)
  - HPCL (Hindustan Petroleum Corporation Ltd)
  - BRPL (Bongaigaon Refineries and Petrochemicals Ltd)
  - MRPL (Mangalore Refineries and Petrochemicals Ltd)
  - CRL (Cochin Refineries Ltd)
  - MRL (Madras Refineries Ltd)

3 Transport
  - pipeline
    - crude oil – IOCL, ONGC, OIL
    - products – IOCL, HPCL, BPCL

4 Marketing
  - controlled products
    - IOCL
    - BPCL
    - HPCL
    - IBP
  - free products
    - many other players for lubricants and other products, parallel marketing of liquefied petroleum gas

In the oil industry, multiple market players are already available

New market players such as Petronet, RPL (Reliance Petroleum Ltd), Essar Oil Ltd, BORL, NRL (Numaligarh Refineries Ltd), and EIRP are also entering the field

Exhibit 3 *Modewise transportation of petroleum products in India*

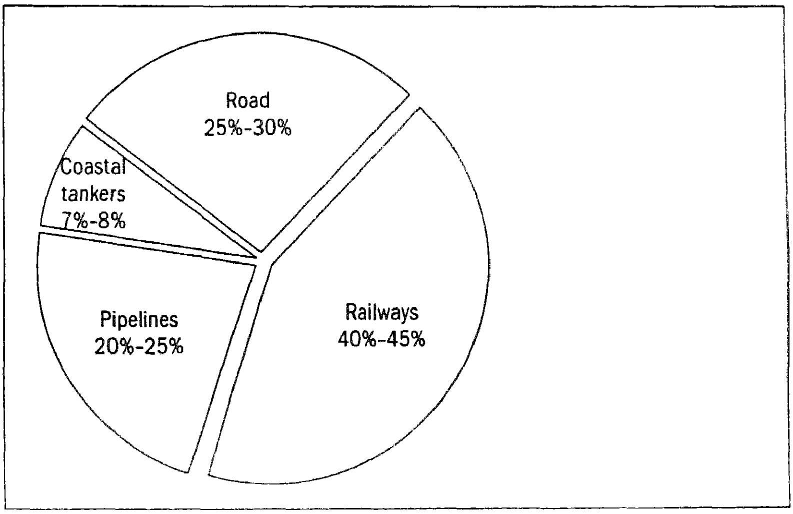


Exhibit 4 *Growth prospects for oil pipelines in India*

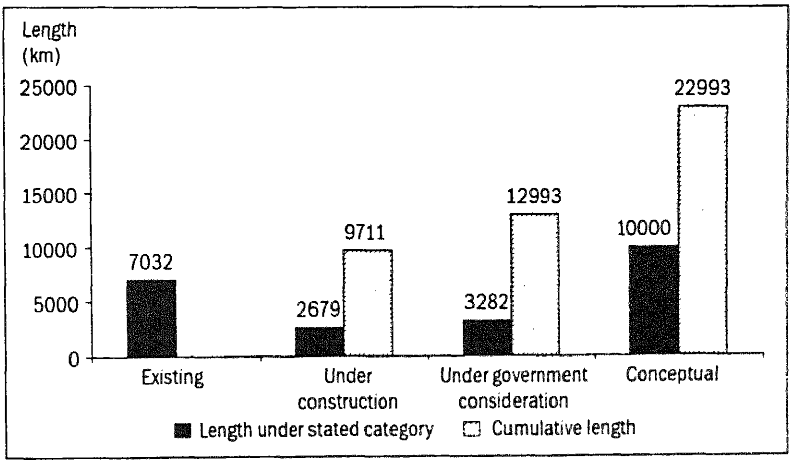


Exhibit 5 *Promoting and facilitating multiple market players*

1. As the oil industry is capital intensive, incentives such as the following are required
   - attractive returns on investment
   - zero customs duty for project imports even for pipeline/marketing projects
   - MODVAT applicability to pipelines
   - infrastructure status to pipeline/marketing network
   - restrictions regarding investment in oil industry on PSUs (public sector undertakings) to be removed
2. Being capital intensive, it is difficult for any player to leave the field

Exhibit 6 *Scope for competition and effective steps for promoting competition*

1. Competition already exists among the PSUs
2. The PSUs are continuously trying to achieve higher market share
3. Once APM (administered pricing mechanism) is dismantled, price competition may also start
4. For free products, prices are being fixed near to import parity due to competition

Exhibit 7 *Demand for petroleum products*

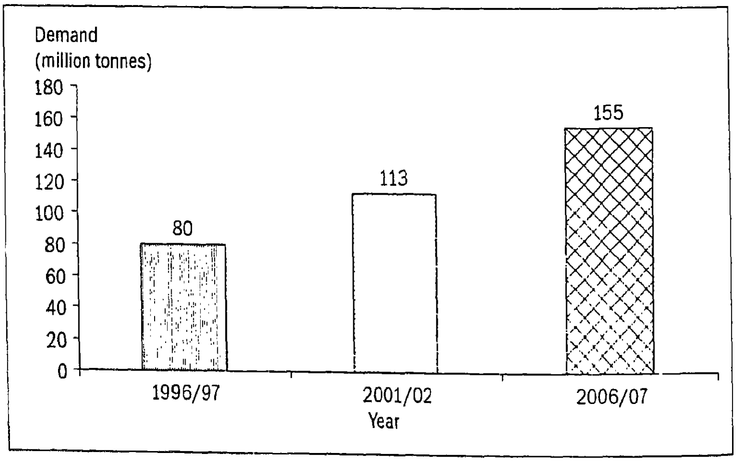


Exhibit 8 *Ensuring quality of products and services*

1. Competitive environment will automatically lead to further improvement in the quality of products and services
2. Improvement in services is already evident in the form of Vision 2000 outlets, etc.
3. Due to new technology, specifications of the products shall improve and be followed strictly
4. A regulatory body may be constituted to give directions to meet certain specifications of the product and regulating practices

Exhibit 9 *Third-party access and common user facilitation*

1. Spare capacity of an oil company may be used by others, particularly infrastructure such as pipelines, tankages, and marketing network
2. Existing pipelines can facilitate common carrier principle on commercial terms
3. Petronet India Ltd has been formed to execute SPVs (special purpose vehicles) to transport petroleum products for various users
4. For common use of pipelines, continuous availability of products at pumping site and ullage at delivery stations are prerequisites
5. Tankages may also be constructed on pipeline ends on common user principle

Exhibit 10 *Security of national and territorial supplies and prevention of scarcities*

1. The regulatory body should ensure that facilities of oil companies are not concentrated in a particular area
2. Particular area may be allotted to each oil company to ensure proper supply without any restriction on other oil companies to operate in that area
3. The regulatory body may also ensure that profiteering is avoided
4. Carrying cost to far-flung areas may be subsidized for maintaining reasonable prices

Gas Authority of India Ltd, New Delhi

J K Jain

Regulatory framework for the gas industry in India

Introduction

Supply of gas in India was first initiated in 1959 by OIL (Oil India Ltd) in Assam. Thereafter, the Oil and Natural Gas Commission (now ONGC [Oil and Natural Gas Corporation Ltd]) commenced gas supply in 1964 in Gujarat. Utilization of natural gas in India which began around this period, picked up gradually from around 2 million standard cubic metres per day during 1970 to 4 million standard cubic metres per day during 1980.

Huge fields of natural gas were discovered in the Western Offshore in the 1970s. The demand for natural gas picked up as it was a clean alternative fuel for use in various sectors, particularly fertilizer and power. Utilization of gas reached the level of around 13 million standard cubic metres per day by the mid-1980s. The Government of India constituted various expert groups to examine the options for optimal utilization of gas. These groups concluded that each fraction of natural gas should be put to optimal use in fertilizer production and power generation, and value-added products such as LPG (liquefied petroleum gas) and ethane/propane fractions as building blocks for petrochemicals to benefit the core infrastructure sector. It was also recommended that a separate gas processing and marketing company be formed and that a gas pipeline infrastructure and other processing plants be created.

The government formed GAIL (Gas Authority of India Ltd) in August 1984 with the corporate mission 'to accelerate and optimize the effective and economic use of natural gas and its fractions to the benefit of the national economy'. The formation of GAIL led to a rapid increase in the utilization of gas and the creation of the necessary infrastructure. Gas utilization has now increased to about 62 million standard cubic metres per day, and is being supplied to various sectors.

Liberalization of the gas sector in India

The Government of India is deregulating the natural gas sector to encourage private participation in exploration, production, transportation, distribution, and marketing of natural gas within the country, as well as its import. It has announced significant policy initiatives to attract foreign investors in various areas of the natural gas sector. Among others, these initiatives enable private companies, both foreign and Indian, to transport and market natural gas in the country. In the future, many more players are expected to be operating, and the government is in the process of setting up an independent regulator for gas transportation, distribution, and marketing. The determined efforts of the government to enhance investment in the industry, disinvestment of equity for improved efficiency, and execution of joint ventures have resulted in tremendous opportunities to private investors.

One of the significant factors fuelling investment in the oil and natural gas sector is the extensive oil and gas distribution infrastructure, such as cross-country pipelines, port terminals, tankages, etc., which has to be developed to meet the projected requirements. The entire petroleum and natural gas sector has been opened for investments through joint ventures and strategic alliances.

Regulation in the natural gas sector

In most countries, gas transportation is an important area of economic activity and pipelines are subject to regulation. Since the mid-1970s, liberalization and regulatory reforms have increasingly been discussed and implemented in the European countries. During the 1980s, these developments reached the US and Canada. In the second half of the 1980s, privatization and measures to encourage competition in the energy sector became prevalent in the UK. In the early 1990s, steps to create an internal market for energy in the European Union sparked off a debate on how to introduce competition in gas markets.

The philosophy behind regulation is that consumer welfare will be maximized in all circumstances by leaving the private sector to pursue individual profit-maximizing strategies. This inspired the policy pursued by the Federal Energy Regulatory Commission of the US and similar institutions in other countries. The justification for the liberalization and deregulation observed in recent years is a belief that competitive markets will, under most conditions, assure the efficient allocation of resources. Broadly, two types of market situations can justify regulation on economic grounds (1) where competitive solutions do not exist and (2) where competitive solutions do exist but are not efficient. In either case, government intervention may be appropriate either to remedy the failure or to accept failure and provide regulation.

Monopoly arises when the least-cost method of 'production' is followed/practised by a single plant rather than several. If only one output is produced, the condition for natural monopoly is economies of scale. When more than one output is produced from the same plant, the condition is economies of scope. In certain circumstances, the threat of other market entrants can produce a competitive solution, even though supply remains monopolistic. In such a situation, regulation may not be considered necessary because the competitive pressure of potential entrants is sufficient to encourage efficiency.

Types of regulation

Three types of regulation arc most relevant to gas transportation (1) behaviour regulation, which shapes the behaviour of firms in areas such as health, safety, and pollution control; (2) structural regulation, which takes place when a regulatory authority determines which firms can engage in particular activities; and (3) conduct regulation, which involves government measures to control the conduct of a given enterprise.

European governments have tended towards direct regulation of pipelines through state ownership, whereas the US has attempted to direct the behaviour of private monopolies by regulating aspects of their conduct. The most common approach has been to operate without earning abnormal profits. As gas transportation involves huge sums and has little or no salvage value, in general, pipeline companies are protected by appreciable barriers to entry and face high barriers to exit. Therefore, a pipeline company is often in a good position to exercise market power. In the view of some governments, this in itself is an argument for regulatory supervision.

The degree to which pipeline market power can be exercised is determined by the following elements.

- The extent of pipeline dominance at the receiving and delivery points
- The way vertical transactions at these points are organized
- The degree of product-extension and integration into purchases and sales which occurs when pipelines operate as private carriers – engaging in joint sales of economically related but separate products, i.e., gas transportation and gas itself
- The pressure exerted by potential competitors, as determined by the height of economic and technical barriers to pipeline entry and exit

Gas pipelines: a natural monopoly

The potentially strong market power of gas pipeline companies stems, to a large extent, from lack of effective competition. Economically, there is no feasible alternative to high-pressure steel trunk pipelines for distant transportation. Pipelines provide a practical link between gas producers and customers. As for potential competitors, they may seek either to connect a spur line or build a new line. Competition among gas pipelines is also influenced by external factors.

The natural gas business, which is of strategic importance, is usually managed by the government for the industrial development of the country. Governments, therefore, have an interest in the entire gas chain – from production to consumption – and seek to regulate the business in the national interest. In many countries, national interest has been served by state ownership of all or part of the gas chain. This approach has certain distinct features such as

- avoidance of unnecessary competing infrastructure investments
- development of the gas supply infrastructure
- coordinated planning and legal enforcement rights for infrastructure.

State support also gives confidence in other countries supplying gas either by pipeline or LNG (liquefied natural gas). Cumbersome and often confrontational regulations are avoided since the state is deemed to act in the national interest.

Free market principles suggest that all industries may operate more effectively and efficiently in the private sector. Disinvestment of state-owned gas companies is now considered to be an important step towards increasing the competitiveness of the gas industry. Often, the gas industry has been regarded as a natural monopoly due to which disinvestment has presented associated issues in certain countries.

Options for regulation

To examine the various options, the government commissioned a study, which was conducted by NERA (National Economic Research Associates), UK, under the technical assistance of the Asian Development Bank. NERA recognized the need for an independent regulator for the oil and gas sector to provide a stable and impartial regime to attract and promote private participation.

Tariff and pricing issues

Principles of tariff structure

Gas pipeline projects are large investment projects with associated risks, such as construction risk, completion and guarantee risk, throughput and demand/supply risk, foreign exchange risk, operating risk, take or pay risks, etc. Therefore, while designing a tariff structure, the following factors should be taken into consideration.

- Tariff is competitive with the alternative fuel at the burner tip even at distances far away from the producing centres.
- Tariff should be able to provide adequate returns to stakeholders.

- Tariff should be transparent and acceptable to all parties involved including consumers.
- Tariff should be able to encourage more investments by ensuring that the projects are bankable.

The tariff structure should aim at achieving an adequate debt-service covering ratio of about 1.5 in such projects. The tariff so set should be able to generate a sufficient project internal rate of return. There are strong contractual obligations amongst all players in the transmission business including shippers, transmitters, and consumers.

Relationship between regulator and tariff

Among the factors to be taken into account while determining the need for regulation is the number of players in the gas T&D (transmission and distribution) industry as well as the investments required. The larger the investments and number of players in the field, the more the need for regulation in order to have a level playing field.

While tariffs and pricing are in the domain of the regulator in a system where large volumes of investments are to be made with a large number of players, investor expectations also have to be taken into consideration for the success of any industry. In other words, while competition is welcome, there has to be a reasonable rate of return on the investments made in the said sector to stimulate more investment and the growth of the industry. This would not only inspire investments and growth in the downstream utilization industry, such as fertilizer, power, and other sectors using natural gas, but also help the overall industrial development of the country. Thus the economic growth rate of a developing country like India would, in the long run, be dependent on the types and intensity of regulation, the pricing and tariff structures which come into play, and the resultant economic development.

While stimulating investments through appropriate tariff structure in the gas production and transportation business, it has to be taken into consideration that large storage and stand-by facilities in downstream industries need to be created.

Thus, tariff should be complementary to such investments to make the use of natural gas competitive with other fuels, thereby encouraging its use and inspiring T&D companies to have a reasonable rate of return.

Methods of tariff determination

There are several ways of arriving at the T&D charges, one of which is after allowing for all costs and a reasonable rate of return. In such a situation, cost determination is based solely on costs given by gas T&D companies, which can be open to dispute. Another uncertain issue is whether the costs should be based on replacement value or on book value of assets. Further, there are no fixed standards as to what a reasonable return could be, which could vary from situation to situation. There is also no incentive for reduction in costs in tariff based on cost-plus return basis.

Under the entry and exit methodology, tariff charges depend upon the distance of the pipeline between the point where the gas enters the system and the point where it is taken out. The customer is charged an entry fee for entering the transmission system at a defined point and also pays an exit charge which depends on the distance through which gas is transmitted before its reaches the exit point. However, as the entry fee to the system is generally high, there is a tendency for short-distance customers to be charged more than those who are at a longer distance.

Another methodology which can be adopted for pricing on the transmission system is the long-run marginal cost. Here, the cost of transporting an extra kilo calorie or volume of gas through the system is calculated and the principal cost related with transporting additional volumes per kilo calorie is the cost of reinforcing a transmission system so that it is capable of operating under extreme conditions with additional demand. These costs are taken into consideration while fixing the tariff for any consumer on the transmission system.

Experiences in tariff setting/pricing

To prevent the possibilities of monopolistic pricing of T&D of gas in the US and the UK, the regulator is empowered to fix transmission tariff and distribution charges. However, in Britain, Ofgas is proposing to reduce regulation of the transmission system to the absolute minimum. As a result, certain areas such as storage, meter reading, ownership and maintenance of meter, etc., are being unbundled, and separate formulas in the form of revenue caps are being introduced and opened to competition and third parties. In countries like Canada, regulators have published guidelines for consumers and transporters to conclude voluntary agreements instead of having a regulatory intervention.

In the Indian situation, tariffs can be fixed either by the regulator or by the market. In the long run, transmission costs are likely to be lower in proportion to the total cost of gas to the consumers and could result in a higher margin to producers/importers, who will be free to charge net back prices. Under such circumstances, a light-handed system is suggested, where the regulator could have the responsibility for facilitation of transportation contracts rather than controlling prices. The regulator could be empowered to prescribe guidelines for arriving at transportation tariff and distribution charges and also to settle disputes referred to by concerned parties.

Service quality and supply security

Service quality and supply security is an important aspect of regulation in the gas distribution sector. This is necessary to ensure that the interest of consumers are protected besides addressing the issue of quality of service and security of supply by the regulator. The regulator must also ensure that standards set for safety of the T&D network are complied with by all players in the gas sector.

Conclusion

The Government of India is pursuing the setting up of a regulatory authority which would broadly cover all relevant points and take into account the requirements of various players in the natural gas industry. In this context, a natural gas act is being formulated, which is likely to be in place soon. With the opening up of the economy and the liberalized terms under the New Exploration and Licensing Policy and coal-bed methane policies, many more players are likely to come forward in the natural gas industry.

Enron Oil and Gas
India, Ltd,
New Delhi

Larry B Morse

Tariff setting and pricing: oil and gas sector

Transition to a liberalized environment: experiences and issues in regulation 475-478

Exhibit 1 *Enron Oil and Gas India, Ltd: experiences in transportation*

1 Offshore
- System of the ONGC (Oil and Natural Gas Corporation Limited)
  - pre-Tapti and Panna-Mukta – 36 inch (91.44 cm) and 42 inch (106.68 cm) parallel pipelines from South Bassein to Hazira
  - post-Tapti and Panna-Mukta – 18 inch (45.72 cm) pipelines tie-in to both of ONGC's pipelines

2 Tapti
- Direct option
  - new pipeline from Tapti to Hazira
  - owned and operated by JV (joint venture)
- Tie-in option
  - JV pipeline to tie in with ONGC's pipelines
  - no operational or financial disadvantage

Exhibit 2 *Tapti gas line and proposed new pipeline*

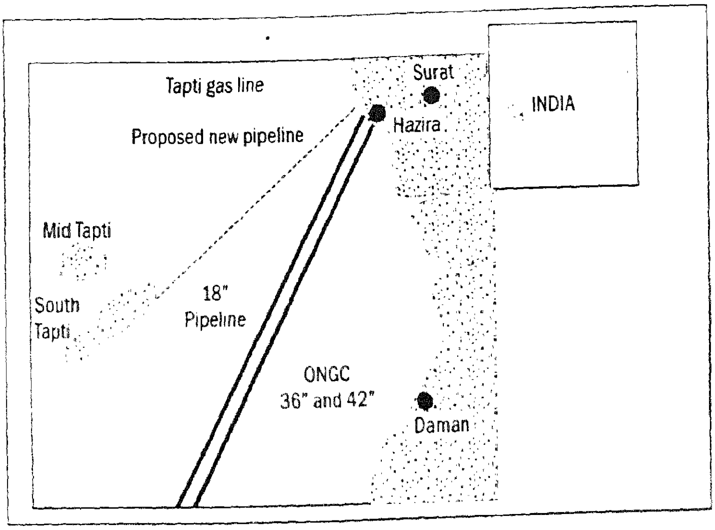


Exhibit 3 *Experiences in tariff*

1 Issues in avoided cost methodology
- capital cost differential
- operating expense differential
- throughput basis
- rate of return

2 Possible reasons for difficulties in tariff agreement
- no existing framework and experience
- no regulatory body to implement the framework
- changing environment for the ONGC and other public sector undertakings
- desire by the ONGC to show that the maximum tariff was received

Exhibit 4 *Gas pipeline tariff*

1 Need to develop a regulatory framework
2 Establish a regulatory authority and organization
3 Establish basis for tariff rate-making

Exhibit 5 *Basis for tariff: cost of service model*

1 Development of cost of service
2 Classification of costs
3 Allocation of costs
4 Design of rates

Exhibit 6 *Cost of service*

1 Development of overall cost of service

O&M (operation and maintenance) expenses
+ depreciation
+ return on rate base
+ income taxes
+ other taxes
= Total cost of service

Exhibit 7 *Cost of service model*

1 Rate base
Gas plant in service
Less: accumulated provision for depreciation
Equals: net plant in service
Plus: working capital
Less: accumulated deferred income taxes
Equals: rate base

Typical of the FERC (Federal Energy Regulatory Commission) rate-base calculations

Rate of return (example)

Component	Ratio (%)	Cost (%)	RoR component (%)
Long-term debt	50	8	4
Common equity	50	14	7
Total	100		11

Note Return = RoR (rate of return) x rate base

All elements of cost of service simply recover projected costs except for the RoR component on equity

In regulatory theory, a pipeline's net income equals the common equity RoR component multiplied by the rate base

Exhibit 8 *Rate development schematic*

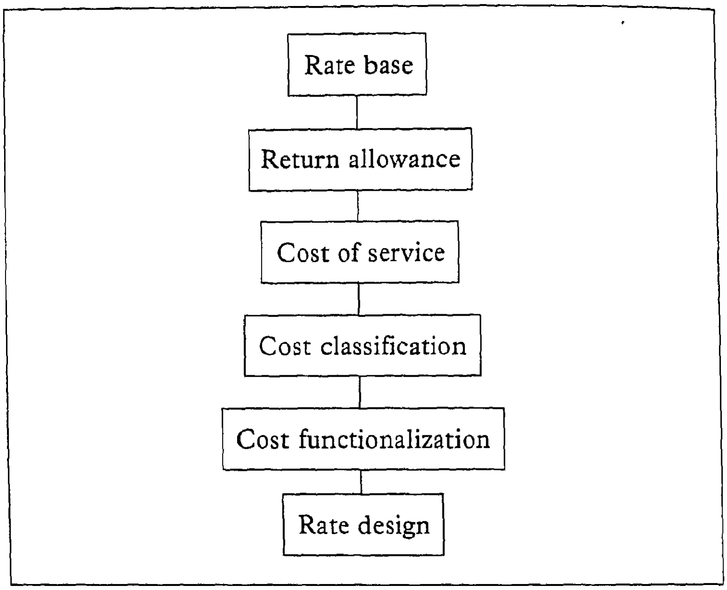


Exhibit 9 *Cost classification: cost behaviour and cost recovery*

1 Cost behaviour: fixed versus variable
- Fixed
    - Depreciation
    - Interest
    - Equity return
    - Income taxes
    - Other taxes
    - O&M (portion)
    - Other revenues (portion)
- Variable
    - Gas purchase costs
    - Fuel
    - O&M (portion)
    - Other revenues (portion)

2 Cost recovery: demand versus commodity
- Demand
    - fixed charge that is paid regardless of actual sales or throughput
- Commodity
    - charge that is paid for each unit of gas sold or transported

Reliance Petroleum Limited, Mumbai

V K Chawla

Tariff and price setting in the oil sector

Transition to a liberalized environment: experiences and issues in regulation 479–480

---

1 The Government of India has initiated phased dismantling programme of APM (administered pricing mechanism) and rationalization of duty structure w.e.f. 1 April 1998.

2 Transition phase will be from 1 April 1998 till the terminal year 2001/02.

3 During the transition period, the following have been initiated.
- Cost-plus formula payable to indigenous crude oil producers is withdrawn.
- Retention pricing concept for all refineries (existing and new has been withdrawn w.e.f. 1 April 1998).
- Petroleum products have been segregated into controlled and decontrolled products. Controlled products are motor spirit, high speed diesel, superior kerosene oil, liquefied petroleum gas, and air turbine fuel. Consumer prices of controlled products are administered.
- Tariff adjusted import parity price at refinery gate for the new refineries and adjusted import parity prices for the existing refineries to be fixed for controlled products.
- Tariff adjusted ex-refinery gate price based on principle of landed cost
  - free on board
  - insurance
  - freight
  - ocean loss
  - landing charges
  - customs duty
- Import of deficit controlled products, marketing distribution, and pipelines transportation of crude and controlled products are covered under administered regime.

4 Actions still to be taken
- Subsidy on kerosene to reduce in a phased manner and the consumer prices to be increased every year.
- Transparency in the passing on of freight and other under recoveries to consumers.

5 Servicing and amortization of oil bonds issued to the oil companies against their outstandings. Low ex-refinery gate prices of controlled products based on import parity on account of fall in prices of petroleum products in the international market. Huge surplus in oil pool account resulting in speedy redemption of oil bonds.

6 Government to reduce customs duty on raw material, namely crude oil, in a phased manner so that the differential between customs duty on finished products included in the ex-refinery gate price build-up and the customs duty on crude oil provides reasonable tariff protection to the refining sector specially to the new refineries being set up.

7 Current tariff structure provides negative protection to the new refineries.

8 Due to the South-East Asian crisis product prices have fallen steeply in international market squeezing refining margins. At current margins investments in new refineries have become unviable.

9 Reasonable and adequate tariff protection is necessary by providing import duty differential between products and crude along the lines indicated in the finance budget proposal, 1998.

Indian Oil Corporation Ltd, New Delhi

Subir Raha

Regulatory reforms: implementing strategies*

Transition to a liberalized environment: experiences and issues in regulation 481–495

Oil industry in India: a perspective

Till recently, India's petroleum industry was subjected to extensive checks and controls in every sphere of petroleum activity – E&P (exploration and production), refining, marketing, and distribution. The close regulation by the ministry was achieved through

- the OCC (Oil Coordination Committee) in the downstream petroleum sector, which performed the functions of planner, coordinator, adviser, and regulator
- direct control in the upstream sector.

The oil price hike in 1973/74 was a major shock, which propelled governments the world over to intervene in the oil sector. In countries like India, which were heavily dependent at that time on imported oil, the interventions were especially pronounced.

In the 1960s–1970s, a wave of nationalization covered all facets of the economy, including the oil sector. In India, foreign oil companies were taken over and the government brought the entire petroleum sector under its fold with a view to achieve regulated growth of oil companies. This was characterized by heavy government controls and justified on the basis of securing adequate, stable, and reasonably priced oil supplies. The oil sector was subjected to extensive licensing, restriction on trade in crude and products, and price controls with subsidy for the economically vulnerable sections of the society. The entire downstream industry operated under a cost-plus system, termed as APM (administered pricing mechanism) in industry parlance. Under this system, all downstream entities – refining, marketing, and distribution companies – are provided with a post tax return of 12% on their net worth.

In the 1980s, once again there were radical changes in policies across the developing countries, with the role of governments in the oil sector being increasingly questioned.

---

* The views expressed in this paper by the writer are in his personal capacity.

The world oil market changed significantly and many countries from Latin America and sub-Saharan Africa to East Asia reduced the extent of state control and moved closer to a competitive oil market. Most of these reforms have either been decontrol of the sector(s) inviting private participation or a more direct large-scale privatization programme.

Major considerations for deregulation

Worldwide, the regulated system suffers from major drawbacks.

- The APM, being a cost-plus system, shackles innovations and gives low premium to efficiency.
- The cost-plus system has led to non-optimal investment decisions which are not in conformity with market dynamics.
- Since product pricing is controlled by the government, political compulsions resulted in delay in revision of prices, leading to large under-recoveries at times.
- The regulated regime discourages foreign investment since transparency is a prerequisite in a market-driven system.
- Under the APM, there have been distortions in product prices, which have led to serious complications for the industry.
- With incremental investment being the need of the hour in all spheres of industry – E&P, refining, pipelines, ports, shipping, tonnage, terminals, and depots – domestic/international debt for these projects is unlikely to materialize in the maze of price controls and pool accounts. Under the regulated scenario, foreign investors are not willing to invest as transparency is low.

A new world order

With a more stable situation prevalent in the world oil market since the mid-1980s and a universal agreement worldwide on the merits of a free market, there has been a progressive decline in the extent of government intervention in the oil sector. These trends are also being increasingly witnessed across Asian economies; Japan, Malaysia, Thailand, and The Philippines are undergoing similar transition paths and moving away from a heavily regulated oil sector to more market-based systems. In India too, a combination of such factors has been at play. There has been a discernible move away from the previously followed heavily regulated policies to a more deregulated environment.

Various steps were initiated first for macroeconomic reforms by the Government of India including devaluation of the rupee, floating currency, attempts to control fiscal deficit, and changes in industrial/exim policy. This was followed by sectoral reforms. The debate on deregulating a key sector of the Indian economy, the petroleum sector, had been going on since early 1991 with the commencement of economic liberalization in India.

With an oil–gross domestic product elasticity of more than unity, India has been one of the world's fastest growing oil markets. Subsequent to reforms in 1991, oil consumption has been growing at a compound annual rate of growth of over 6% for the last three years, the rate of growth for the year 1995/96 being even higher at 10%. With a consumption of 79 million tonnes in 1996/97, India is the fourth-largest oil market in Asia. With the growth in demand expected to remain healthy over the next decade, projections indicate that demand in India would reach a level of 155 millions tonnes by 2006/07.

This would entail massive investments in all spheres of the oil sector. Estimated investments in the refining and marketing sectors alone for the Ninth Five-Year Plan (1997–2002) are about 258 billion rupees (7 billion dollars). Private capital would need to play a large role in supplementing efforts of the PSUs (public sector undertakings) in fuelling the need of the Indian economy.

Some of the key objectives for ushering in deregulation are listed below.

- Increased competition by allowing entry of more players in the market. A competitive environment provides the necessary boost for companies to deliver value to customers and provide products at reasonable prices.
- A sector driven by market forces is likely to attract investment capital and receive favourable responses from the international community, thereby facilitating investment in a deregulated market.
- Price decontrol will mitigate political interference in decisions relating to the economic pricing of petroleum products. The experience of the power sector in respect of domestic and agriculture tariffs is reflective of the effect of political interference on the health of the sector.

The objectives would desirably result in a large number of players in this sector. However, unless this is accompanied by a competitive environment, the objective of efficiency is unlikely to materialize. Against the above backdrop, the MoPNG (Ministry of Petroleum and Natural Gas) had set up an oil industry R Group (restructuring group) to prepare a detailed time-bound programme of reforms in the oil sector. The basic objective was to create conditions facilitating the entry of the private sector in the Indian oil sector, which is expected to lead to a more competitive oil market.

R Group The R Group was set up under the chairmanship of the Secretary, MoPNG. It comprised representatives from the public and private sectors and economists and other industry experts. The R Group made several recommendations and also prepared a time-bound programme for introducing reforms (see Annex 1).

In the meantime, several measures have already been put in place to encourage private participation in the petroleum sector and to dilute government holdings in existing PSUs. A large number of such measures relate to both the upstream and the downstream sectors. Of particular importance are the opening up of the upstream sector to private entrepreneurs, granting of permission to set up refineries in private or joint sectors, and introduction of parallel import and marketing of select petroleum products.

Proposed new regulatory framework

Vital sectors like hydrocarbons, which are extremely important for the economic development of the country and affect all spheres of life, cannot be left fully to market forces. Deregulation does not, in any way, imply a complete removal of all checks and balances in the system.

The OCC's role and activities in the downstream sector would undergo significant revision in the post-APM scenario. The OCC in its current form would no longer exist, and would be replaced by two bodies - the regulatory body and the Petrofed (Petroleum Federation). During the transition period, all the functions of the OCC would be performed by the regulatory body and Petrofed. In the final state, i.e., post-APM, some functions would become redundant and would be regulated automatically by the market.

The roles of the ministry and the regulatory body would be well defined. The government will continue to frame certain basic policies for the petroleum sector such as tariffs on crude and products, subsidy on sensitive products, allocation of superior kerosene oil for each state, product specifications, and issues of safety, health, and environment.

Implementing strategies

The functions of the proposed regulatory bodies in the upstream, downstream, and gas sectors are given in Annexes 2, 3, and 4.

The basic objective of putting a proposed regulatory framework in place is to protect consumer interest and ensure that consumers get best value in terms of quality, quantity, price, goods, and services. In order to achieve this, the regulatory framework should promote all activities and actions, which are important components in realizing this objective.

The nature and degree of regulation is dynamic and will change over time. The regulator will require authority to implement government policy in a climate of market uncertainty and would, therefore, need a range of powers – from the most active to the most passive. Therefore, the regulator would need to have both the flexibility and the authority to determine the appropriate degree of regulatory interventions. The regulator would have to be guided by two prime objectives (1) to promote and safeguard competition, and (2) to regulate with a light hand.

During the transition phase, the extent of regulation may have to be greater and more interventionist than under conditions of full competition.

It is also imperative to clearly define the lines of demarcation between the ministry and the regulatory authority, which would be valid both in transition and in a totally deregulated environment. The ministry's responsibility would be to set policies for the oil sector, i.e., define the rules under which companies will operate in the Indian oil sector. The regulatory body must ensure that rules laid down by the MoPNG are adhered to; existing players do not create barriers to entry for new players; the industry does not indulge in cartelization; the interests of the consumers are fully protected; and improvement/changes, if required, in policies and rules are recommended to the government.

The regulatory agency must be an independent institution, professionally managed with well-defined targets and accountability, and should not be a subordinate office of the ministry. This would be most essential in the transition phase where functions of regulatory agencies would be closely watched by prospective investors and the industry.

Independent funding of the agency would be a critical factor, perhaps through a cess on the sale of oil products or through budgetary appropriation of the government. The mechanics of the management of transition is as important as management in a totally deregulated scenario. It would be essential, during transition especially, to prioritize various functions and roles identified with the regulatory body. Such prioritization would take cognizance of the fact that during transition, existing bodies, for example, the OCC, would continue to function concurrently with the proposed regulatory bodies. The OCC has been doing an excellent coordination job in allocating crude to various supply plants, product movements from refineries, the shortfall being made up by imports, etc. Sudden withdrawal can only lead to dry-outs in far-flung areas and non-availability of crude. The transition from the OCC to regulatory body will have to be smooth and flawless to achieve the objectives of deregulation.

The regulatory authority would not only have to prioritize its functions and responsibilities but also draw a clear-cut time frame for various activities and inform the existing regulatory body requiring the switch-over of roles.

It is important to focus on the following aspects.

- The transition from current systems to the system where regulatory bodies take over has to be phased out smoothly.
- The prioritization of functions must be defined for each regulatory body. Functions crucial for implementation would need to be developed first, followed by gradual evolution of other roles.
- Coordination amongst the different regulatory bodies must be ensured. The government has proposed a structure for regulatory bodies which would consist of the government itself, the regulatory authority, and voluntary association of oil companies.

Presently, functions carried out by the ministry and the OCC would be distributed amongst these three bodies. While a few functions such as setting up of policies will remain with the government, other functions would be distributed among the regulatory authority and voluntary associations.

The role of regulatory bodies and those who will be regulated must be fully understood to enable smooth operations of the industry, especially in the initial phase. While it would be necessary to maintain an optimum distance from those who are being regulated, the regulatory body will have to adopt a partnership approach / participative management style. Workshops, seminars, communications, and public hearings would help to infuse confidence and spread the message of transparency. Knowledge-based decision-making, based upon sound economic, legal, and management research is mandatory.

With a view to facilitate implementation of the proposed regulatory structure, whether upstream, downstream, or gas, the schemes should have minimum provisions and the rest may be left for the government to decide whenever any serious problem which the regulator is unable to solve arises. The regulator's role has to be that of a developmental and information gathering body and supplier of this information to the industry.

A non-bureaucratic culture would be imperative for effective functioning. The industry would be looking for stable arrangements about basic issues such as how the market would work. Therefore, it would be necessary for the regulatory body to make the rules of the game absolutely clear, which should not change on a case-to-case basis. The policies and procedures of the government would have to be well defined to avoid unnecessary delays especially when huge investments are involved at high risk factors.

Entry and exit barriers have to be removed. Restructuring the ministry's functions is an important issue since its functions will be reduced and the ministry will assume a different character with the setting up of an independent regulator. A change inside and outside the ministry is essential. It is also important to ensure cohesive functioning between various ministries including the MoPNG, the MoST (Ministry of Surface Transport), the MoF (Ministry of Finance), the MoR (Ministry of Railways), and the MoEF (Ministry of Environment and Forests).

It would be necessary to have a goal-based approach with a view to evaluate the functioning and performance of the regulatory agency. The body must be given a concrete time frame for various activities with clear accountability for performance since a number of companies including PSUs would no longer operate in downstream alone but would opt for an integrated approach and hence, would have to coordinate actively with different regulatory bodies. Unless performance criteria and targets are fixed for regulatory authorities, it will become difficult for oil companies to meet their business plans.

Any rule framed by the regulator should be conducive to the fast development of infrastructure, which would be one of the most critical differentiators in a rapidly changing petroleum sector. Speedy execution of the infrastructure in a compressed time frame would certainly form a key performance area, especially in the transition phase. Accord of approvals for development of ports and joint ventures is an area where speedy and expeditious approvals would be needed.

The role of risk as an essential element of oil enterprise is well established. The regulatory body will have to create an environment for enterprises to take risks. Increased risk would also mean increased returns. In transition, the regulatory body while fixing rates should ensure that the same helps in encouraging investment in infrastructure. Any price intervention by the regulator must be discussed openly and with transparency.

The regulatory body must pay attention to developing spot markets, features, and options in the sector, which though very common in the international oil market, still do not exist in India. An important aspect where the regulatory body should not interfere in any way is concerning the manner of purchase that a particular company adopts. It would be essential to see that it has adequate information. In a competitive environment, companies would prefer to choose the best means of buying crude or products that may involve high risk but carry a promise of high return. Therefore, there should not be any interference from the regulatory body in specifying or laying down a certain share accruing from long-term contracts. At the same time, long-term supply arrangements are a function of interest of the supplier and buyer. It could be that a particular supplier feels secure (with a guaranteed return) and therefore prefers a long-term contract with a stable and assured buyer.

During the transition phase, the regulator must ensure free flow of products to enable oil companies to maximize value addition. Supply plans will have to be drawn up and the regulator will monitor these. Such a mechanism will however apply only to the transition stage.

The regulatory body has to play an equally important role in the completely deregulated environment. It needs to have effective enforcement machinery when the market is being exploited and when problems arise on account of cartelization. The regulatory body will function as a quasi-judicial authority to deal with direct complaints of consumers or complaints from oil operators against others and take necessary action. The body will have the role of watching, monitoring, anticipating, and directing the sector. Ensuring availability everywhere and concessional prices for certain sectors is an important function to be discharged by the government. The regulatory authority has only to decide whether the policies of the government are being followed by oil operators or not.

The regulatory body is responsible for effective coordination and interaction with various agencies such as the MoPNG, Petrofed; other regulatory bodies such as the DGH (Directorate General of Hydrocarbons), the Gas Regulatory Body, the Central Electricity Regulatory Commission; other bodies such as the Oil Industry State Directorate, the Centre of High Technology, the Petroleum Conservation Research Association, the Bureau of Indian Standards, pollution control boards; and other ministries like the MoEF, the Ministry of Industry, the MoST, the MoF, the Ministry of Power, and the Ministry of Coal.

The regulatory authority must interact closely with Petrofed both while defining the rules and regulations for effective operation of the downstream petroleum sector and in determining the qualifying criteria and measures of efficiency. The regulatory authority must get constant feedback from Petrofed to enable the commission to be responsive to the needs of industry and interpret and influence policy as required.

The regulatory authority would essentially ensure that government policy objectives are achieved in regulating the downstream oil sector. Thus the regulatory authority would derive its framework for regulation from the policy outlined by the Government of India. At the same time, the regulatory authority would be expected (since it would be well placed) to bring to the attention of the government any policy changes/interventions required to achieve better safeguards for national and consumer interests.

While the functions of the regulatory authority have been defined to regulate the activities of the downstream oil industry, several backward and forward linkages would exist with other economic activity areas regulated by their own mechanism, e.g., E&P activities would be regulated by the DGH. As such, crude availability, which is an essential input to downstream activity, falls under the purview of the DGH. Similarly, the natural gas sector is likely to have its own regulatory mechanism, although there are several cross-influencing issues between natural gas and petroleum products, particularly arising from the fact that these are substitute energy forms. On the downstream side, the electricity sector is a major consumer of petroleum products. This sector shall be regulated by the Central Electricity Regulatory Commission and the state electricity regulatory commissions.

The regulatory authority, as part of its functions, would ensure compliance with standards/guidelines described by various bodies with regard to safety, health, environment, and quality issues relating to the downstream petroleum industry, products, and services. These bodies would include the Oil Industry State Directorate, the Centre of High Technology, the Petroleum Conservation Research Association, the Bureau of Indian Standards, and others. Hence apart from ensuring compliance with standards specified by such bodies, the regulatory authority would also provide the necessary feedback to these bodies on possible changes, modifications/additions that may need to be put in place on the basis of its interactions with the industry, consumers, and a survey of the international literature.

A large number of other ministries or the Government of India would also be setting policies that would influence operations of the downstream petroleum sector. Most important among them are the MoF, the MoEF, the MoR, and the MoST. The regulatory authority would provide the necessary interaction between the various boards in the downstream petroleum sector and also set mechanisms in other ministries.

As regards local level coordinators, since it is envisaged that there will be a gradual shift to a market-driven system, the role of coordinators would get marginalized except in the event of emergency. In such situations, the existing coordinators, who move back to the parent company, and the dormant coordinators could be activated for a short period.

As mentioned earlier, the regulatory authority would have to be put in place along with the OCC with gradual transition in a phased manner.

On account of close linkages between various functions – E&P, downstream, and gas – it would be essential for regulatory bodies to ensure close coordination, especially with regard to functions which overlap. Issues which could be common to different regulatory bodies would need to be resolved through structured periodical meetings, etc., to facilitate faster decision-making which the industry investors would be looking for.

Annex 1

Proposed phasing of reforms as envisaged by the R Group

Phase I 1996–98

- Rationalization of retention margin
- Withdrawal of the concept of a retention margin for refineries
- Deregulation of natural gas pricing
- Decanalization of furnace oil and bitumen
- Partial deregulation of the marketing sector including freedom to appoint dealers/distributors
- Removal of the subsidy on HSD (high speed diesel) / reduction of the subsidy on kerosene, LPG (liquefied petroleum gas), and input for fertilizers

Phase II 1998–2000

- Pricing of indigenous crude on the basis of average FoB (free on board) price of imported crudes (inclusive of cess and royalty)
- Rationalization of royalty and cess
- Further deregulation of the marketing sector
- Further reduction of subsidy on kerosene, LPG, and input for fertilizers

Phase III 2000–02

- Decanalization of aviation turbine fuel, HSD, and motor spirit

Annex 2

Functions and responsibilities: regulatory authority for the upstream sector

1 To provide technical advice to the MoPNG on issues relevant to the exploration and optimal exploitation of hydrocarbons in the country and on the strategy of taking up exploration and exploitation of oil and gas reserves abroad by national oil companies.

2 To review the exploration programmes of companies operating under Petroleum Exploration Licences granted under the Oilfields (Regulation and Development) Act, 1948 and the Petroleum and Natural Gas Rules, 1959 with a view to advising the government on the adequacy of these programmes.

3 To reassess the hydrocarbon reserves discovered and estimated by the operating companies in discussion with them.

4 To advise the government on the offering of acreage for exploration to companies as well as matters relating to relinquishment of acreage by companies.

5 To review the development plans for commercial discoveries of hydrocarbon reserves proposed by the operating companies and advise the government on the adequacy of such plans and exploitation rates proposed and matter relating thereto.

6 To review and audit concurrently the management of petroleum reservoirs by operating companies and advise on any mid-course correction required to ensure sound reservoir management practices in line with the optimal exploitation of reserves and the conservation of petroleum resources.

7 To regulate the preservation, upkeep, and storage of data and samples pertaining to petroleum exploration, drilling, production of reservoirs, etc., and to cause the preparation of data packages for acreage on offer to companies.

8 To advise the government on the laying down of safety norms and framing regulations on safety in oil field operations, prescribe pollution control measures, and assist in inspection and periodic safety audit.

9 To issue essentiality certificate for import of goods required in the oil industry for exploration and exploitation activities.

10 All other matters incidental thereto and such other functions as may be assigned by the government from time to time.

Annex 3

Functions and responsibilities: regulatory authority for the downstream sector

1 Subject to provisions of the Act, the regulatory authority shall have powers to issue directions, pass orders, and secure compliance in respect of the following functions through any person(s) charged with that responsibility.

- Implement the oil policy outlined by the Ministry of Petroleum and Natural Gas, emphasizing the guarantee of supply of products throughout the country.
- Protect consumers' interests with respect to price, quality, and availability of products and give necessary directions to ensure this.
- Require any potential investor interested in setting up a downstream facility – be it related to refining, import, transport infrastructure, marketing, or distribution – to submit an attested copy of the Memoranda of Entrepreneurship, provided that such submission shall not exempt the investor from securing all other statutory clearances with respect to quality, health, safety, and the environment from proper authorities.
- Levy fees at such rates and in respect of such services as may be determined by regulations.
- Regulate the working of the downstream oil organizations and promote their working in an efficient, economical, and equitable manner; and settle disputes between various entities connected with downstream oil operations.
- Promote competitiveness and progressively involve the participation of the private sector, while ensuring a fair deal to consumers.
- Promote fair trade and prevent cartelization and monopolies and combinations in restraint of trade and any unfair competition in the downstream oil industry; encourage practices that serve the public interest and are intended to achieve efficiency and cost reduction. For such purposes, the regulatory authority may resort to public hearing.
- Verify the compliance of strategic stock holdings, as per the coordinated plan submitted by Petrofed, with the government order covering both the quantity and the geographic location of such stocks, and ensure its proper management and disposal.
- Inspect, either directly or through agreements, with recognized authorities appointed by the regulatory authority, the activities of the petroleum industry including compliance with safety and environmental standards/guidelines, as well as apply administrative and monetary penalties foreseen by law, regulation, or

contract; also including the strategic stocks being held by the designated parties.

- Organize and maintain the information and technical data bank related to downstream petroleum activities; publish international oil prices so as to enhance public awareness towards determining the reasonableness of market prices; obtain demand forecast for petroleum products in different parts of the country from Petrofed for its own or government use. For this purpose, the regulatory authority may draw on other bodies for technical support/inputs.
- Oversee and encourage good practices with respect to the conservation and rational use of oil and its products and the preservation of the environment.
- Facilitate policy formulation that would further the above objectives and provide an interface through which interactions with other ministries / regulatory bodies on matters of common interest can be channelled.
- Assist the government in the planning and development of the downstream oil industry and in the management of crisis situations.
- Ensure transparency while exercising its power and discharging its functions.
- Give directions to concerned authorities.

2 The regulatory authority shall have the power to act as arbitrator or to nominate arbitrator or arbitrators to adjudicate and settle disputes arising between the companies in accordance with the provisions of this Act and the regulations to be prescribed and this shall be a condition of operation.

3 The regulatory authority will entertain the grievances brought to its attention by those parties that show cause of such grievances adversely affecting the efficient functioning of the downstream petroleum business or the protection of consumer interests vis-à-vis the downstream petroleum business including the delivery and usage of petroleum products.

Annex 4

Functions and responsibilities: regulatory authority for gas

1. The regulator shall prescribe guidelines for arriving at transportation tariffs and distribution charges.
2. The regulator will also fix limits in respect of import cost of liquefied natural gas / natural gas and on cost of production of domestic gas. However, this will not be done on a case-by-case basis.
3. The regulator will select distribution companies for specific areas in a fair and transparent manner.
4. The regulator can intervene in cases of disputes.
5. The regulator will ensure that all gas supply contracts carry adequate conditions regarding quality of service and security of supply and can insist on compliance with prescribed safety standards.

TERI,
New Delhi

Leena Srivastava

Can the tortoise always win? Petroleum deregulation in India

Transition to a liberalized environment: experiences and issues in regulation 496-500

Major reform initiatives

In 1990/91, India was faced with a serious economic crisis that saw its gross fiscal deficit rise to 8.4% of its GDP (gross domestic product) and a revenue deficit of 3.3% of GDP. The Gulf war added a burden of 2.9 billion dollars to the current account and placed enormous pressure on India's already stressed foreign exchange reserves. At the end of June 1991, India had foreign currency reserves barely enough to finance two weeks of imports.

Recognizing the challenges posed by the petroleum sector, the Government of India set up the Strategic Planning Group on Restructuring of the Oil Industry in 1995 to outline a reforms strategy for the hydrocarbons sector as well. The 'R Group', as it came to be called, was set up under the chairmanship of the Secretary, MoPNG (Ministry of Petroleum and Natural Gas) and comprised representatives from the public and the private sectors, economists, and other industry experts. In its report submitted in 1996, the R Group made several recommendations and also prepared a time-bound programme for introducing reforms aimed largely at reducing the deficit in the oil pool account and encouraging the infusion of fresh capital into the sector.[1]

However, private investors still had some major concerns. These included the effective rate of protection offered to refineries, rights to the marketing of petroleum products, and the need for a level playing field. The Government of India, in an effort to address the concerns of the private parties, is attempting to distance itself from all operational issues. It, therefore, drew up the frameworks for independent regulation of the natural gas sector and the downstream petroleum sector. The Directorate General of Hydrocarbons would continue as the regulator of the upstream oil sector.

The regulatory framework is expected to promote all desirable activities that, among others, are defined as follows.

- Creation of a market-based production, supply, distribution, and pricing system that promotes economic efficiency and competition. Such a system would provide products to consumers at least cost and lead to optimal utilization of national resources.

---

[1] Please see Annex 1 of *Regulatory reforms: implementing strategies* (p 491)

- Ensuring energy security for the country and its citizens. This would translate into providing consumers with adequate and secure supplies of products at all times.
- Ensuring that the industry operates under principles that recognize the importance of protecting the environment, and mitigate any kind of damage that resource extraction, transportation, and utilization have on the environment.

While the bulk of the work on the natural gas regulatory bill was completed in 1996, the downstream petroleum regulatory bill was drafted in mid-1998. Neither of these bills has been cleared by the Indian Parliament.

ivate sector rticipation

Meanwhile, demand for petroleum products is continuing to grow. TERI's analysis of the projected refining demand–supply reveals that most of this demand can be met because of the tremendous response to the government's call for private participation in this sector. However, demand can fluctuate for a variety of reasons, consumption levels can change because of several factors including, most importantly, tariff changes. India is moving towards a system where tariffs are increasingly, at least for some products, being linked to international price movements. Therefore, while we still have to develop good models that are able to link demand to fluctuating price levels, the picture for the next few years is fairly clear. Additionally, while the capacity expansion requirements may be met, the enormous capital implications of this pattern of development should be taken into account. If demand continues to grow in this manner, it is imperative that the interest of private investors in this sector is sustained. However, alarmingly, private sector interest in this particular activity seems to have declined considerably from what it was two or three years ago.

In the case of exploration, development, and production also, interest is waning. Statistics on the responses to the various rounds of bids that have been invited for E&P (exploration and production) show no clear trend. But this is not surprising as the response is dependent on the specifics of the package that has been offered in a particular round. As for the NELP (New Exploration Licensing Policy), on which the roadshows are on just now, the timing is bad because international oil prices are extremely low. As such, any great interest at this time in oil exploration is unlikely. India has probably taken just too much time in the process of designing the NELP and of responding to its experience in the various rounds of exploration bids. Things need to be done much quicker, and once an in-principle decision to do something has been taken, it should be implemented as quickly as possible.

Dismantling the administered pricing mechanism

There has been a fair amount of progress in the dismantling of the APM (administered pricing mechanism). Prices of some petroleum products have already been decontrolled, some decanalization is already in place, there are moves to remove subsidies in some cases, and reduce the subsidy level of certain other products, all of which are positive developments. But there is a need to take a look at what remains to be done and the time frame in which we would like to do it.

Corporatization of public sector undertakings

In connection with the corporatization of public sector oil companies, the recommendation on their 'Navaratna' status came some time in early 1997. But only recently (a week or ten days ago), were the boards of the three identified oil companies expanded, highlighting the enormous gestation period between a decision being made or recommended and its actual implementation. Additionally, the expansion of the boards represents a partial implementation of the recommendations made. There is still a long way to go before the oil companies get complete autonomy in their operations.

Private investor interest

All of the above would seem to indicate a general disillusionment with the reform process and a waning level of interest in private companies – domestic or foreign – in investing in the Indian oil sector. Given the lack of progress beyond the stage of an expression of interest, the excitement of investing in the refining industry seems to be declining. In the case of E&P, there is uncertainty in gauging the level of interest because we need to see how the NELP roadshows go and the response they evoke. Gas imports, particularly in the form of LNG, look promising but avenues to accelerate it should be explored. In this regard, pipelines seem to hold some hope.

Future strategy

Given this scenario, the immediate steps that need to be taken to rejuvenate interest are (1) to have a regulator in place as quickly as possible and (2) to undertake some long-term strategic thinking or planning. Since we have made an in-principle decision to establish a regulatory body, a concerted effort is called for to make this a reality. Once the independent regulator is in place several of these issues can be effectively tackled, if necessary in consultation with the MoPNG.

If the attempt is to try and resolve every issue and work out every step of how the industry is going to work in a post-reform stage, then seemingly there is already a kind of no-confidence motion that is being passed on the regulator and on his ability to take decisions in the interests of the consumer. Various institutions involved in the regulatory process have to work in close coordination with each other.

Long-term strategic planning would necessitate the need for a clear vision of where we want to go so as to enable the industry to plan for the longer term and not just for the next two to three years. For this, a road map for reforms is required. The R Group has a clear structure and time frame regarding the direction in which the oil sector is headed. But it must be ensured, and the industry needs to feel confident, that the policies announced will remain in place for a pre-specified and reasonably long period of time so as to protect its investment decisions.

In this context, and going by what is happening in the international arena, it would seem that Indian oil companies should seek to diversify their core business areas. Internationally, there are a number of oil companies moving into other areas of business. Given a clear road map for reforms, every industry should be able to look at whether it will be able to function profitably and efficiently in the new environment and to determine the extent to which it needs to diversify into some other activity/sector so as to keep the bottomlines viable.

Efficiency improvements should attract high priority. In yesterday's session, it seemed that an industry representative was seeking special concessions for putting up a state-of-the-art refinery. The investment decision was made by this private investor keeping in mind the current scenario – the uncertainties and the expectation that the reforms processes may either be ahead of schedule or delayed. Having made this investment and with the refinery slated for commissioning in three or four months, the question remains: who is going to offtake the product? These are risks that businesses have to evaluate and plan for. Needless to say, a clear road map would have helped this decision-making process. But, the Indian industry needs to learn to live by its decisions; it has always been treated with kid gloves and has to get out of this particular way of functioning. Also, the benefits of some of the efficiency improvements that are taking place are not being passed on to the consumers. If anything, it is the consumer that has got short shrift in the economic development process in the country thus far, and if there is a regulator in place the consumer can hope for some redressal.

Global climate change is a universal concern. The response to this could result in a change in the demand for oil at the global level and in the technologies that utilize oil, gas, and coal, and could throw up opportunities in the form of providing carbon storage options and so on. The industry in particular should look at what the implications of some of these developments are in the context of all the other developments that are taking place.

Consumer involvement

One of the major areas of concern is the extent of consumer involvement in this sector. The small consumer does not seem to feel a part of the reform process. Undoubtedly, small consumers would have a significant stake in determining the pattern of development that takes place in this sector. There is probably little awareness or confidence amongst consumers on who to approach and how to approach in the case of a grievance. All this is linked to the question of transparency of operations of the oil industry, which can be improved. While it may seem paradoxical, the industry should actually try and see how it can build up some of these consumer groups so that they are able to participate effectively in this process. In the long run, the existence of good consumer response bodies that provide feedback can only benefit the sector.

Cross-sectoral issues

In the power sector, there is the concept of the independent system operator, in which connection we could draw a parallel between transmission of electricity and pipelines. This concept essentially implies that there should be a clear distinction between the ownership of transmission and distribution infrastructure and the management of the same. This ensures an efficient operation of the facility and provides a level playing field to all users.

This brings us to the issue of competition development versus competition creation. We seem to be waiting for new refineries to be set up. I am not sure how much competition we can have or would desire to have in the pipeline sector. In the case of pipelines, it seems that we are creating another monopoly – but not one that will be independent of the upstream activities as an independent system operator would be required to be. The MoPNG in particular, and the regulator when it comes in place, should look at how best some of these competitive forces can be created in the short term. In the process some industries are bound to suffer setbacks; but it is time to consider what the consumer is getting out of the reform process.

Massachusetts
Institute of
Technology,
Cambridge, USA

Joanne M Kauffman

Transition to a liberalized environment: comment on implementation strategies

Transition to a liberalized environment: experiences and
issues in regulation 501–504

The economic trend in the world today is towards a market forces paradigm away from state intervention. Thus the challenge of the public and private sector decision makers is to manage transition to the global liberalized environment so as to minimize social disruption and dislocations and bring in maximum long-term benefits to the society. In the long run, benefits of liberalization and increased competition are likely to accrue – from reduced prices and market structure concentration to increased efficiency and greater regulatory freedom. However, optimism about the benefits can mask the enormous difficulties inherent in the path to transition and the political and social hurdles that must be overcome along the way. In India, the challenges of transition are rendered even more complex than in many other countries by the historical and contemporary daunting social and economic challenges.

The role of policy

In India, the transition to a liberalized environment will be affected by many forces at the global, national, and regional levels. The new direction will not become obvious for some time as a wide range of approaches are attempted and tested in the critical policy, crossroads at which India stands today. The setting up of policies to guide the transition is crucial. But a well-designed policy while necessary, is in itself not sufficient to ensure the desired reform. Policy provides a framework for reform, but the effectiveness of policy reform will be determined by other factors, both exogenous and endogenous to the domestic political environment. These factors will include international developments in economic markets and technological changes that occur at an increasingly rapid rate. Such developments may enhance or thwart the transition to liberalization depending in part on the institutional capacity to understand, assess, and respond to these developments.

The establishment of new regulatory authorities, including those that will facilitate liberalization in the oil and gas sector, is an important component of the institutional infrastructure that is needed to facilitate the transition. The real challenge, however, lies in implementation, constraints to which must be taken into consideration as policy is designed. For example, while setting in place mechanisms to foster and encourage competition, regulators must anticipate and plan for the strong opposition that will come from particular, and politically powerful, interests that have been the beneficiaries of public subsidies in the past. Similarly, as markets are liberalized, competition for investment among states in India will fuel pressure for change and increase tension between central authorities and state governments. This in turn raises the need for mechanisms to deal with these pressures, to balance interests, and provide means to move forward with decision-making in a transparent manner.

Transparency in the policy development process is crucial to effective implementation for several reasons. First, it helps to instill confidence in the process. Second, it ensures multiple stakeholder input (thereby minimizing the potential for blocking coalitions to form later in the process). Third, it helps to ensure a creative and dynamic process that will lend itself to the discovery of robust policy options. There are a number of tools to facilitate transparency in the policy development process, holding of public hearings being one of them. However, other models are being developed that make use of advanced information technology tools to sort out policy options and that provide means for taking into consideration multiple viewpoints as well as economic and technological factors. The integration of such tools in the policy- and decision-making processes can help build institutional capacity that is capable of implementing desired policies. To ensure that the guidelines emanating from the policies are implemented, they must be backed by laws. Experiences of India and the US in setting up regulations for natural monopolies are nested in very different environments. The backdrop of such regulation in the US is the need to overcome the excesses of unfettered economic activity, whereas in India the approach to liberalization stems from the opposite spectrum – a controlled economy. Both countries are trying to find alternatives to the extremes of rigid government controls and complete laissez-faire. There are many alternatives between these extremes, and at different stages, and under different circumstances, countries will choose different pathways to guide their development in this period of increasing globalization. However, no matter which alternative is chosen, the market and the state need to complement each other. This is because markets do not function in a vacuum and effective policy is needed to fill the vacuum to reduce uncertainties, create a climate for innovation, and provide the infrastructure for growth. That infrastructure includes policies, legal instruments, and a capacity to implement and enforce laws that promote, rather than impede, technological development; provide good educational opportunities for citizens to ensure a competent and competitive workforce; and contribute to social welfare.

le of ademic stitutions

The transition to a liberalized environment suggests a new role for the state rather than an elimination of its functions in economic development. Transition requires significant changes in all sectors if its new role is to be accepted and ensuing policies are to take root. In this transition, the academic community has four important functions (1) developing tools to aid the government in assessing technological and policy options; (2) in education at all levels; (3) as facilitator of dialogue; and (4) in research.

TERI and the National Regulatory Research Institute, Ohio State University have taken a bold step in forming a partnership on regulatory reform, and TERI has created a division for regulatory and policy studies. This can provide an important focal point for debate on transition to liberalization. At the MIT (Massachusetts Institute of Technology), the role of science and technology in decision-making at all levels is being examined. Universities and other academic institutions are well suited to this task – particularly those having a strong research base and close ties with the industry. In the context of implementation strategies for the oil and gas or other sectors, such institutions can have a role similar to that of the former US Office of Technology Assessment which for many years provided the Congress with an assessment of policy options.

Universities also can facilitate a transition to a liberalized environment through their educational function. Liberalization will take a long time requiring a new mindset not only in governments and in the private sector, but throughout the society. This challenge is especially daunting in India where social education on liberalization is needed to facilitate acceptance of reforms by the public. But the functions of university / academic institutions regarding education is not only long term; on a short term, institutions can help fill the vital need for training of policy and decision makers in both the public and private arenas including leadership training for legislators. This is because effective implementation will require leadership in these sectors and training programmes, such as that for which TERI is preparing at its campus now, will help to build the local and regional leadership necessary to implement reforms. The MIT is well suited to serve as a facilitator for consensus building, for increasing stakeholder involvement, and for testing means to develop robust policy options.

Finally, universities and other academic institutions play a vital role in carrying out research and providing knowledge needed to support decision-making which is increasingly becoming science- and technology-intensive. This is because a major challenge for government decision makers is lack of scientific data on which to base decisions. This is not unique to India. A comparative research project at the MIT has shown the constraints and significant hurdles to effective use of science and technology in decision-making. Institutional barriers to the incorporation of such knowledge are significant. Improving the channels for better incorporation of this knowledge into the decision-making process is of utmost importance to providing an environment for continued development and prosperity.

Australian Competition & Consumer Commission, Dickson ACT, Australia

Allan Asher

Australian gas reform

Transition to a liberalized environment: experiences and issues in regulation 505-515

Introduction

In meeting the objectives of the national competition policy, the natural gas industry in Australia has entered a new era in terms of both regulation and competition. The Gas Pipelines Access (Commonwealth) Law 1998 has been passed and pipelines will submit access arrangements to the relevant regulator once the relevant jurisdiction has proclaimed its legislation so that they may be assessed against the National Third Party Access Code for Natural Gas Pipeline Systems (hereafter referred to as the Code).

The ACCC (Australian Competition and Consumer Commission) will be the relevant transmission regulator of covered natural gas pipelines in most Australian states (Western Australia is to set up its own regulator), and the distribution regulator in the Northern Territory.

Objectives of competitive reforms in the natural gas industry

The Hilmer Report suggested that whilst some assets in a market will be naturally monopolistic, those businesses downstream and upstream of the asset can operate in competitive environments, where there is effective access to the services offered by the natural monopolist. Economic modelling has provided an estimate of the potential benefits that are available from the development of the gas industry. Studies carried out by the Australian Bureau of Agriculture and Resource Economics for the Industry Commission estimate that the economic returns from new gas pipeline interconnections alone could total 1 billion dollars[1] (in net present value terms) in Australia over 35 years (Industry Commission 1995). If greenhouse targets are met, the returns could rise to close to 1.5 billion dollars as more gas is used.

On the other hand, the AGA (Australian Gas Association) estimates that continued restrictions on interstate trade in gas could result in additional cost to Australian consumers between 1.5 and 4 billion dollars in net present value terms by the year 2029/30 (AGA 1992).

---

[1] Dollars in this paper refer to Australian dollars.

During the 1970s and 1980s, both the US and Canada undertook significant gas reforms that led to a more competitive market environment. Based on the experience of these countries, Australian consumers can expect to reap significant benefits from gas industry reform. At the same time, there has been no indication of a loss of security of supply or service reliability.

Thus, the successful introduction of competitive reforms to the gas industry is a key to providing incentives to participants at all functional operating levels to improve the efficiency of their production, resource allocation, and investment decisions and to minimize costs. These benefits are not limited to the gas industry as gas is an important input in many Australian industries, influencing their ability to compete both domestically and internationally. Benefits are likely to be distributed broadly throughout the economy, through lower input costs to the Australian industry, lower prices to final customers, and more efficient use of resources.

Hence, regulatory and public policy reform of the gas market is vital to Australia's ability to capitalize upon growing international and domestic demands, and to capture its natural advantage as a low-cost energy supplier.

Ensuring that competition can work to yield these welfare-enhancing results gives rise to two regulatory issues (1) access and (2) access prices.

Access

There is a need to ensure that businesses which operate in the upstream or downstream markets are able to access the services offered by the natural monopoly asset. Particular concerns may arise if a monopolist has a downstream arm to its business as it may be in a position to impede competition in the downstream market by denying competitors access to its services or by selling its services at a favourable price to its downstream arm. Such behaviour could seriously limit the effectiveness of competition in the upstream or downstream markets.

Access prices

Monopoly status confers significant market power on an asset owner, enabling it to earn monopoly rents by charging prices in excess of competitive levels. Further, a monopolist might restrict supply to increase prices and this could seriously retard growth in downstream industries. To prevent inefficient outcomes, the challenge for the regulator is to ensure that users upstream and downstream of the monopolist are charged prices which reflect the true costs of providing the service. Otherwise, monopoly rents will be passed on to end-users and the benefits of reforms in the natural gas industry will not be realized.

National Third Party Access Code

The Code aims to provide access to the services provided by monopoly pipeline assets. On 7 November 1997, the Australian heads of government agreed to implement the Code. Given that the Code confers powers on Commonwealth bodies such as the ACCC and the National Competition Council, Commonwealth legislation and complementary legislation in each state and territory is required. The Commonwealth recently passed its Gas Pipelines Access (Commonwealth) Law 1998. South Australia, Northern Territory, and New South Wales have already proclaimed their legislation and the other states are set to follow.

The Code aims to achieve a uniform national framework for third-party access to natural gas pipeline systems and to facilitate the development and operation of a national market for natural gas by providing rights of access to pipelines on fair and reasonable terms. It aims to address both the regulatory problems identified above and tries to ensure that third parties, such as the downstream competitors, have access to the services provided by gas pipelines and that the terms and conditions upon which those services are obtained are fair and reasonable.

Role of the Australian Competition and Consumer Commission

Under the Gas Pipelines Access Law, the relevant regulator for gas pipelines will differ according to the type of pipeline under consideration. The ACCC is the relevant regulator for access to services provided by transmission networks in all states and territories except Western Australia. Distribution networks will be regulated by independent state-based regulators, except in the Northern Territory, which has requested the ACCC to regulate both its transmission and distribution pipelines.

This new and diverse range of regulatory functions has brought out the importance of state and federal regulators coordinating their assessment of cross-jurisdictional applications for regulatory approval. To this end, jurisdictional regulators have formed the Utility Regulators' Forum which seeks to coordinate research and regulatory response to a wide range of issues including information requirements of regulators, ring-fencing of accounting information, monitoring of quality standards, 'best practice' and benchmarking, appeals processes, and regulatory databases. The ACCC also has an energy committee on which the heads of state counterpart agencies, who are ex-officio members of the ACCC, provide inputs to the ACCC's regulatory decisions enabling regional considerations to be taken into account.

Incentive regulation and the National Gas Code

Most of the access pricing principles under the National Gas Code are contained within chapter 8 of the Code. The ACCC seeks to minimize the regulatory burden on the industry (and hence lower the overall cost to consumers) by maximizing competition wherever possible. In cases of natural monopoly, where competition is typically neither feasible nor efficient, the ACCC generally seeks to create a set of incentives which encourage those in positions of market power to conduct their business in a socially desirable manner without the regulator having to second guess their every move. Facilitation of competitive secondary markets in service provision, such as pipeline capacity, is an efficient method of reallocation and can aid the ongoing regulation of the primary service provider.

The theoretical underpinning for incentive regulation is that with the ability to retain cost reductions as profits, the service provider has a strong incentive to be more efficient in the provision of access services and expand its market share and contribute to market growth. Higher-than-expected performance in both these areas will lead to better than initially-expected profits and better utilization of resources. Generally, users of the services benefit directly only in future periods after regulated prices are subjected to review and the new cost structures are taken into account when re-establishing the regulated prices.

To achieve the potential efficiency gains from competition in the upstream and downstream markets, it is important that the prices of access do not reflect the exercise of market power by the service provider and that the structure of pricing to various users and between different categories of service be based on the costs involved in providing each service. The price paths for services in question are usually defined at the beginning of a review period to achieve these ends.

If regulation adjusts prices to simply allow the service provider to recover costs and achieve a normal rate of return on investment, the service provider will have little incentive to be efficient in the provision of such services; indeed this may also serve as an incentive to reduce efficiency. Hence the need for incentive-based regulatory mechanisms.

Most incentive mechanisms seek to avoid heavy-handed revenue control and to divorce the permitted charges for access from the reductions in costs or efficiency gains which the service provider is able to achieve over and above those that were expected at the beginning of a review period. Hence, above-normal profits are only restrained after the period under review has passed and the regulator looks forward to the next period.

There is a welter of analytical tools available to policy makers, regulators, and stakeholders to shape or check on incentives to achieve a higher level of cost-efficiency in the regulated firm. They can also be used to generate incentives for investment at levels that are consistent with allocative and dynamic efficiency in the industry, and a sharing of the benefits of regulation between the firm, the customer, and the community.

The National Gas Code provides that, where appropriate, reference tariff policies should contain incentive mechanisms. While in the first instance it is up to the service providers to develop their reference tariff policies and submit them to the regulator for approval, the ACCC is willing to discuss possible incentive mechanisms and their appropriateness to given circumstances with service providers.

It is important to remember that although regulatory control over the earnings of private assets may appear somewhat heavy handed, as natural monopolies they impact on the earnings of the wider community and perform a public function, for instance, in transmitting telephone messages or electricity over the wires by the path of least resistance. Therefore the public will have an interest in the efficiency, safety, cost, and other aspects of how that job is done.

The ACCC will not proceed to make determinations without public consultation, which, importantly, includes the asset owner. While investment in infrastructure is essentially an industry decision, the ACCC will regulate with the objective that such decisions are not distorted by access conditions being too harsh (e.g., access prices set too high, leading to either a lessening of competition or wasteful duplication) or too lax (e.g., access prices set too low, leading to inefficient use of existing facilities). The aim is to encourage decision-making consistent with maximizing benefits to the users and the community.

It is essential that reform outcomes must be objectively reviewed from time to time, taking care to distinguish outcomes of reform initiatives from inevitable pricing trends consistent with technological change and to distinguish and have regard to both the level of competition and the level of enhancement of competitive capacity. This includes R&D and expenditure on exploration and infrastructure development.

Transmission regulation under the Code

With the passing of the Gas Pipelines Access (Commonwealth) Law 1998, the ACCC will soon begin receiving access arrangements from pipeline owners for assessment against the Code.

Public consultation and approval process

Within 90 days of the Code coming into force in a given jurisdiction, a covered pipeline is obliged to offer access arrangements to the regulator for their respective systems. Chapter 2 of the Code sets out the public consultation and approval process required to assess a service provider's access arrangements. For the purpose of approval, the service provider must submit an access arrangement with accompanying access arrangement information to the ACCC. The Code identifies minimum mandatory requirements for access arrangement information.

Upon receipt of the access arrangement and access arrangement information, the regulator must inform all interested parties. Section 2.10(b) of the Code requires the regulator to publish a notice in a national daily newspaper which describes the covered pipeline to which the access arrangement relates, where copies of it can be obtained, and which asks for submissions by a specified date (within at least 28 days).

Following receipt and assessment of submissions, the regulator must issue a draft determination either approving or not approving the access arrangement. In the latter case, the draft determination would need to specify the amendments required for regulatory approval.

Having provided a copy of the draft determination to the service provider and all other interested parties, the regulator must then call for further submissions within at least 14 days. After considering these submissions, the regulator must issue a final decision (1) approving the original access arrangement, (2) approving a revised version submitted by the service provider (in the event that the draft decision does not approve the original access arrangement), or (3) not approving the access arrangement at all. In the final case, the regulator must outline what amendments would be required for approval and a time by which a revised access arrangement including these amendments must be submitted.

If the regulator does not approve the access arrangement and the service provider fails to make the requisite amendments, Section 2.20 provides for the regulator to draft and approve its own access arrangement.

Criteria for approving a proposed access arrangement

To approve a proposed access arrangement, the regulator must be satisfied that it contains the elements, and satisfies the principles, set out in Sections 3.1 to 3.20 of the Code. The proposed access arrangement must include a number of policies as well as dates for the review and expiry of the access arrangement.

Policies which need to be included in the proposed access arrangement are listed below.

- A services policy, covering the services being offered in the access arrangement.
- A reference tariff policy, outlining the reference tariff(s) for those services and associated terms and conditions.
- A capacity management policy, stating whether the covered pipeline is a contract carriage pipeline or a market carriage pipeline.
- A queuing policy, setting out the priority a prospective user would have against any other prospective user to obtain access to spare and developable capacity.
- A trading policy, explaining the rights of a user to trade its right to obtain a service to another person (only applied where the capacity management policy used is the contract carriage policy).
- An extensions/expansions policy, stating whether extensions or expansions to the covered pipeline will be treated as part of the existing pipeline for the purposes of the Code.

Section 3.18 specifies that an access arrangement may apply for any length of time. However, should it be proposed to apply for more than five years, the regulator must consider whether there is a need for a review mechanism to address the risk of forecasts underpinning the access arrangement proving incorrect.

In assessing a proposed access arrangement against Sections 3.1 to 3.20, the regulator is directed in Section 2.24 to take account of a number of factors including

- the service provider's legitimate business interests and investment in the covered pipeline
- any firm and binding contractual arrangements the service provider already has regarding the pipeline
- the economically efficient operation of the covered pipeline
- the public interest
- the interests of users and prospective users
- anything else the regulator deems relevant.

Reference tariff principles

Sections 3.3–3.5 of the Code require the establishment of a reference tariff and a reference tariff policy. Chapter 8 of the Code outlines the principles the reference tariff and the reference tariff policy must comply with. The regulator must be satisfied that the reference tariff and reference tariff policy are consistent with a number of objectives set out in Section 8 of the Code. These focus mainly on ensuring that the reference tariff is based on the efficient cost (or anticipated efficient cost) of providing the reference service. These include

- providing the service provider with the opportunity to earn a revenue stream which will cover the efficient cost of delivering the reference service
- replicating the outcome of a competitive market
- not distorting investment decisions
- providing an incentive for service providers to reduce costs and develop the market for the reference, and other services.

Further, the reference tariff policy must include a detailed statement of how reference tariffs have been derived, including statements covering how the following items will be dealt with or determined.

- Appropriate recoverable cost
- Establishing the capital base
- Initial capital base
- Investment in new facilities
- Capital contributions
- Surcharges
- Capital redundancy
- Rate of return
- Depreciation schedule
- Non-capital costs
- Allocation of costs between services
- Allocation of costs between users
- Prudent discounts
- The use of incentive mechanisms

In addition to this, Section 8.2 states that the regulator must be satisfied that the reference tariff and reference tariff policy serve a number of basic functions.

- They must ensure that the revenue generated from the sale of all services under the access arrangement meets one of the three following basic revenue methodologies – cost of service approach, an internal rate-of-return approach, or a net present value approach.
- Where more than the reference service(s) are provided by the covered pipeline, that proportion of the service provider's total revenue which comes from the reference service(s) must be determined according to one of the three aforementioned methodologies.
- That proportion of total revenue to be recovered from the service provider is received from the users of the reference service.

- The reference tariff should include some form of incentive mechanism to reward the service providers with greater revenue when they can improve the efficiency and costs with which they provide the service.
- The regulator must be satisfied that all forecasts represent best estimates arrived at on a reasonable basis.

Ongoing functions of the regulator

At any time after an access arrangement has been approved, the service provider can apply for a review of the access arrangement and propose revisions. The regulator must then consider such proposed revisions, following an identical public consultation process to the initial approval process.

The ACCC is also charged with a significant ongoing monitoring and enforcement role. Some of the areas that will require monitoring are

- compliance with the ring-fencing arrangements
- whether ring-fencing arrangements are appropriate given any changes in market circumstances
- potential breaches of the hindering access prohibition
- whether target rates-of-return have been achieved
- whether proposed costs are incurred
- whether proposed demand projections are accurate
- effectiveness of the incentive mechanisms.

Contracts entered into by service providers with associated companies are unenforceable unless they have been approved by the regulator. This typically involves a process of public consultation.

The ACCC will also have a significant ongoing role in resolving disputes over access to spare or developable capacity where negotiations have broken down. The ACCC would have to determine whether there is a dispute or not, and if so, whether arbitration is the most appropriate course of action. The Code sets out detailed principles an arbitrator must take into account in making any arbitration determination, and any restrictions upon determinations. The regulator may appoint an agent to act as an arbitrator for it.

Upstream reform

The ACCC is encouraged by the pace of downstream reform in all jurisdictions, including the national commitment to ensuring third-party access to its pipeline facilities. However, the ACCC is concerned that unless market structure reform initiatives are taken to facilitate competition in the upstream sector (in exploration for, and production and processing of, gas), consumers may not ultimately receive all the potential benefits of the transmission and distribution reforms that are occurring.

The ACCC believes that the development of greater competition between gas producers may be possible through measures such as the following.

- Construction of new pipelines and links to facilitate inter-basin competition between producers.
- Construction of underground storage facilities.
- Liberalization of the delivery point of gas from processing plants, thereby making possible interconnection of pipelines served by the plant and fostering opportunities for secondary market sales into non-traditional geographic markets.
- Development of enforceable regimes for third-party access to processing facilities and gathering pipelines. The ACCC is aware that an initial effort is being made by state governments to foster upstream access (South Australia and Victoria).
- State policy initiatives to liberalize the allocation of acreage to new entrants, thereby creating future opportunities for competition within the concerned gas basin.
- The development of independent marketing where practicable by members of production joint ventures.
- Measures to foster the development of financial instruments for trade in pipeline capacity and gas, thereby encouraging swap and secondary market activity to complement contractual sales.
- Use of the Trade Practices Act 1974 by the ACCC to prevent mergers and acquisitions of gas production businesses where the consequence would be a substantial lessening of market competition in contravention of Section 50.

The issue of upstream reform is currently being examined by the upstream issues working group.

Conclusion

In conclusion, the reform process under way in Australia's gas industry holds huge promise for growth both within the industry itself and flows through to many other industries.

The ACCC supports these reform initiatives but notes that its assessment of the arrangements is a considerable task as each arrangement presented to the ACCC will need to be assessed according to its merits.

The ACCC looks forward to continuing its relationship with the industry to achieve competitive outcomes. To this end, the ACCC will endeavour to make its processes and procedures as transparent as possible. Relevant documents relating to the Victorian reforms and other work of the

ACCC's Gas Group can be found on the ACCC's Internet home page at www.accc.gov.au. The ACCC Gas Group is also available to consult with interested parties about the competitive reforms currently under way in the industry.

ences

AGA. 1992
Gas Supply and Demand Study
Canberra: Australian Gas Association. 142 pp.

Industry Commission. 1995
Australian Gas Industry and Markets Study
Canberra: Australian Government Publishing Service. 262 pp.

Summary of question and answer sessions

Transition to a liberalized environment: experiences and issues in regulation 516–517

Regulatory framework

Queries were raised to determine whether the regulatory authority would regulate capital investment plans in E&P (exploration and production), refining, and marketing. The panel said that the regulator would be monitoring capital investment but would work towards eliminating redundancy in monitoring by other concerned bodies.

Regarding the role of the regulator vis-à-vis the Navaratna package, the panel pointed out that the two were not linked. The Navaratna package basically confers more authority and freedom to oil companies ensuring that they are managed more by boards than by the government as was the earlier practice. The activities and role of a regulator are quite distinct from increased empowerment of oil companies.

The role of the OCC (Oil Coordination Committee) after the regulator was in place was also questioned. The panel envisaged no formal role for the OCC after deregulation. Its activities would be restricted to the transition phase to ensure a smooth switch-over to a deregulated industry. During this phase, the OCC's role in liquidation of the oil pool account was particularly highlighted.

There was discussion on the need for an integrated regulatory authority for the entire industry. The panel explained that the diversity in roles of the regulator would make a single authority inefficient. Even if a single authority were put up, it would need to have three separate divisions or wings corresponding to E&P, gas, and downstream sectors.

The need for the regulator to work as an enforcer and an adjudicator was also questioned. In light of the duties of the regulator to protect consumer interests and ensure a level playing field for all players in the industry, the panel opined that such powers were necessary.

Market structure

The deliberations were centred on the need of the common carrier principle for pipelines. The panel responded that a majority of the existing pipelines are owned by specific companies. The relative market shares in the sale of petroleum products differ from the ownership pattern wherein the Indian Oil Corporation has a virtual monopoly. Since parallel pipelines to existing ones would not be bankable projects, there is a need to declare pipelines as common carriers, thereby ensuring a level playing field for all players.

Tariff setting

Regarding whether the costs would be transmitted to the customers on account of inefficiency in old refineries, the panel felt that the refiner would have to switch to new specifications and increase efficiency rather than passing on the price to the consumer.

Regarding linkages between gross refinery margins and tariff protection, the panel said that due to overcapacity in the Asian region, product prices were quite low. It has been already decided that in the long run, self-sufficiency in refining is a preferable outcome for India. To induce investments in refining, tariff protection is necessary. Evidently, existing refineries would also need modernization and would be incurring investments for which protection in the forms of tariffs would be required. Tariffs should however be linked to the global environment and brought down when the prices rise again.

It was stated that tariffs should not be refinery based and must be applicable to all refineries whether old or new. The panel was also of the opinion that crude import duties ought to be brought to zero as soon as possible. The resulting loss of revenue to the government could be made up by revising excise duties. In the long run, however, excise duties would also need to be rationalized.

The issue of price fixation by cartelization was also raised. The panel opined that the regulator would need to ensure that cartels are not formed while letting the market decide prices.

Regulatory reforms: present and future strategies

The fourth session initiated a debate on consumer orientation for the industry. While it was generally agreed that companies have to be consumer driven, there were discussions on the roles envisaged for the Petrofed. One viewpoint considered Petrofed an agency primarily responsible for intra-industry coordination on financial and operational settlements. Industry members opined that the industry and consumers develop mature outlooks on their own. Consumer organizations promoted by the oil companies would be redundant.

On the other hand, some viewed that due to the complexity in operations of the industry the consumer is not aware about the industry in general. It was argued that oil companies need to play an active role in consumer education so that the consumer can make erudite choices.

The role of Petrofed was also envisaged in promoting investments in the sector and advances in R&D, the benefits of which would trickle down to the consumer.

Concluding session

■

Presentation of session discussions: power

Gaurav Bhatiani

■

Presentation of session discussions: ports

C S Venkatraman

■

Presentation of session discussions: telecom

M Karuppasamy

■

Presentation of session discussions: oil and gas

Rahul Deep Singh

■

Panel discussion

■

Concluding remarks

R K Pachauri

■

Vote of thanks

S K Sarkar

TERI,
New Delhi

Gaurav Bhatiani

Presentation of session discussions: power

Transition to a liberalized environment: experiences and issues in regulation 521-522

Regulatory framework

There is a broad consensus on the need for regulation in the power sector given the current state of market development. In this context, it is evident from the US experience that the need for regulation would continue to exist in advanced and sophisticated power markets, though the role of a regulator might evolve over time. It is critical that the accountability, transparency, and independence of the regulatory commissions are maintained. At the same time, the regulatory commissions need to take into account the social and political environment and be acceptable if they are to be effective. There is a broad consensus also on the need for a transition period because the regulatory commissions cannot possibly come up with solutions overnight. Divergent views exist on the appropriate route for setting up the regulatory commissions, i.e., whether it is has to be through the Electricity Regulatory Commissions Act, or through a separate state legislative act.

The possible mechanisms of avoiding overlaps between the role of the CERC (Central Electricity Regulatory Commission) and the SERCs (state electricity regulatory commissions) have also been discussed.

Market structure

It was pointed out that unbundling of the power sector was perhaps not the only mechanism available for restructuring the electricity industry. There is a need to experiment with unbundled and vertically-integrated utilities. As organizations in the infrastructure sector tend to operate in a number of sectors, the concept of multi-utility commissions will need to be explored. In the context of evolving a market structure, regulatory commissions will need to demonstrate a flexible and dynamic approach, responding to the evolving needs of the sector. The Orissa model and the Australian examples are pointers to what the problems are and how they could be avoided.

Tariff setting

For effective tariff setting, customer demand forecast (by category) should be available with the utilities and the regulatory commissions. There is a broad consensus on reduction in cross-subsidies and a move towards long run marginal cost. This, however, would need to be considered in view of the social and political environment. The government cannot wash its hand off the sector and must continue giving it support during the transition period. The latest tariff order issued by the OERC (Orissa Electricity Regulatory Commission) is a case in point and other state regulatory commissions would probably need to follow this creative and innovative approach. There is some asymmetry between the roles allocated to the CERC and the SERCs with regard to the generation business; while the CERC has control over the National Thermal Power Corporation and other central generators, the SERCs existing today have control only over the power purchase process.

Discussing the experience of Israel in this area, it was explained that the tariffs there seem to be low today because cheap funding has been available from the government. The tariffs in Israel are linked to the consumer price index and are automatically adjusted every six months.

Other issues highlighted include (1) the advantages of availability-linked tariff for bulk supply for grid operation and economic efficiency and (2) the need to consider pricing of the environmental factors. It was felt that there are significant opportunities and potential for efficiency improvement in the sector.

Future strategies

Long-term planning with different sectors like coal, and oil and gas is essential. The regulatory commissions should take on a broader perspective, and try to interpret the Acts creatively where considerations of environment and sustainable development are also accounted for. Various mechanisms were explored whereby the consumers could be protected in the new environment. There are training requirements of the regulatory commissions, the regulated utilities, and the consumers. The role of renewable energy and the possibility of a market for green electricity also need to be explored.

Indian Ports Association, New Delhi

C S Venkatraman

Presentation of session discussions: ports

Transition to a liberalized environment: experiences and issues in regulation 523-525

The 6000-km-long Indian coastline is dotted with many ports, 11 of which are major ports under the administrative control of the central government. The other ports are under state governments. The Indian Ports Act, 1908 is applicable to all ports and mainly deals with navigational safety and conservancy aspect of the ports. The Major Port Trusts Act, 1963 is applicable to all the major ports. It vests the administrative control and management of the major ports with the Board of Trustees and defines the power and duties of the trustees. The major ports handled around 251 million tonnes of cargo during the last financial year (1997/98) accounting for about 90% of the maritime trade of India.

The need for additional port facilities (approximated at about 424 million tonnes of cargo to be handled at the end of the terminal year of the Ninth Plan) and the shortage of funds has given rise to the idea of privatization. In October 1996, the Government of India announced guidelines for privatization. As per the commitment made in the guidelines, an independent tariff regulatory authority for major ports was created in January 1997. TAMP (Tariff Authority for Major Ports) is empowered to frame the rates for services rendered by the ports and for use of the property of the major ports. It also stipulates the statement of conditions under which such services are to be rendered. TAMP has been given the very limited power of fixing the port tariff and not of regulating the whole gamut of port activities. TAMP has limited autonomy and depends on the government's budgetary support to finance its activities. The government's role in port management is to act as a regulator and the port operator.

As the major ports have reached their saturation point, most of the private investments are expected to be in the state ports / minor ports. Players of both minor and major ports demand a level playing field, perceiving that the advantage is with the other. Section 42 of the Major Ports Trust Act stipulates that freedom be given to private operators to fix the rate even if it is below the rate notified by the tariff authority under Section 48. But this concession is not available to the government-owned major ports when they themselves are rendering the services.

The liberalization process and the eventual corporatization or commercialization of the government-owned port trusts are other points of contention. Private ports have no single bankable concessional agreement or document prepared by the government with which they can approach the FIs (financial institutions) or appraising agencies to raise finances. Moreover, government departments and the FIs do not treat the private sector on par with the public sector or government-owned ports.

The following are some of the questions raised during the sessions.

- Is the tariff alone to be regulated in the port industry? Or must the entire administration be regulated?
- Are the safety aspects and social responsibilities of the port to be regulated through a single regulatory authority?
- Should the national level policy for the development of ports encompass state ports also?
- In the case of corporatization/privatization of the government-owned port trust, should corporatization be done first or should existing management be reoriented first?
- Can there be a smooth transition from the present set-up to the corporate organization?
- How many regulations and acts are port operators and port operating companies going to be subjected to once it is corporatized or how many regulatory authorities are going to govern the working of the corporatized ports?

The government-owned port trusts have a huge asset base. But as the risks associated with the assets or the ports may not attract investors, there is always a danger of the share being quoted below par. The commercial activities in the existing major ports should be privatized and given to private operators, i.e., the regulatory role and the operational role must be clearly segregated. A regulatory role may not be required once competition picks up, but in the interim TAMP must confine to tariff setting in consultation with the ports. Subsequently, there should be a regulatory authority for all port operating companies to regulate the entire working of the port and also for social accountability and safety.

A shift from the present concept of operating ports in India to the landlord concept was advocated. In such a scenario, the landlord will function as the regulator as far as that particular port is concerned, and the operational areas will be taken care of by the private providers of port facilities. Operating companies in the port area should finance the regulators. Once the landlord concept is achieved and the landlord port is made the regulator for that area, an independent dispute resolving machinery should be created for resolving disputes between the service provider and the port user.

Other points that came up for discussion include the need for a strong political will to bring about labour reforms. A comprehensive national level policy is required for an integrated development of ports. This would entail the central government giving directives to the state government regarding whether to create competition by converting all possible areas on the coastline into ports at the cost of viability of existing ports. There is also a need for a multi-modal development along with port development. A white paper to approach the entire gamut of regulation in all sectors is needed. A common approach, one during the transitory period of liberalization and another when the entire economy is liberalized, is required. There is a need to develop a model statute clearly defining the role and functions of regulatory authority in the light of the scope and functions of the different regulatory authorities already created.

TERI,
New Delhi

M Karuppasamy

Presentation of session discussions: telecom

Transition to a liberalized environment: experiences and issues in regulation 526-527

As expected in the current context, the focus of the discussions was on TRAI (Telecom Regulatory Authority of India), especially its role which now stands restricted. There was overall agreement, with a little opposition, on empowering TRAI so that it could be a truly independent statutory body and perform the functions it was meant to.

Current status

The discussions highlighted a few important points on the current status of telecom in India. The century-old Indian Telegraphic Act, 1885 and the Indian Wireless Act, 1933 are still in effect at a time when far-reaching changes in telecom and information technology are taking place. The sequence of reforms in the telecom sector was not proper as the policy framework and the institutional arrangements were not made conducive before the reforms were started, and the regulator was not in place. The result is disputes between various parties that are yet to be resolved. In spite of earlier clarifications from the Supreme Court on the role of the regulator, the role of TRAI stands restricted after the recent Delhi High Court verdict. Licence fees charged for basic and mobile services are considered very high. The Delhi High Court verdict and the inflexible nature of the DoT (Department of Telecommunications) have eroded investor confidence.

Consensus

There was general agreement on the following points. It was emphasized that there should be separate entities to perform the functions of the operator and the licensor, which are currently under the purview of the DoT, with clear separation of roles for policy maker, regulator, and operator. Regulation, it was felt, is required only during the transition; once the market becomes competitive, the regulator's role should be minimized. While learning from the experiences of other countries was appreciated, copycat regulation was not. As the TRAI Act is interpreted in different ways, it was suggested that it should be amended to empower TRAI, leaving no scope for ambiguity. It should be made mandatory for the government to seek recommendations from TRAI. The policy should be made flexible and dynamic as it is required to take care of converging technologies, services, and markets of information technology, telecom, and broadcasting. As tariff fixing is done by TRAI, spectrum allocation also should be done by it, instead of the Wireless Planning and Coordination Wing, Ministry of Communications as it is done now. Operators should have a free choice to select their technologies based on business, technical, and market considerations. Interconnection between basic, mobile, long-distance, and international operators should be made mandatory as a part of the interconnection agreement when they are given the licences. Utilities like the Railways, state electricity boards, Power Grid Corporation, etc., should play a role in building the telecom infrastructure.

Contentious issues

There was disagreement on the Netco and Servco (separate set of networking and service companies) model. Another contentious issue was with regard to serving uneconomical markets, where the DoT felt that private operators would not be able to fulfil the obligations under USO (universal service obligation).

Suggestions

The panellists forwarded the following suggestions during the sessions. The incumbent of Indian telecom should be stabilized at 30% once the competitive market takes over. There has been a suggestion to review the nomination criteria for TRAI members and the procedure of selection. The regulator should control the market structure while the issues related to defence, and of political and strategic importance, should be handled by politicians as national interest cannot be sacrificed for the free market. The access networks should become an integral part of interconnection issues. The newcomers should be able to buy services from the existing monopoly. Also sales (unbundling) in terms of components or parts of a network should be allowed to the newcomers. Regular compilation of statistics on cost is important for tariff exercises. There has been a suggestion to create separate USO funds.

There was an announcement from the government inviting suggestions on the New Telecom Policy, 1999.

TERI,
New Delhi

Rahul Deep Singh

Presentation of session discussions: oil and gas

Transition to a liberalized environment: experiences and issues in regulation 528-529

Regulatory framework

In the light of public–private partnerships in the future there is a need for a regulatory authority to reduce multiplicity of authorities, balance diverse interests, promote resource conservation for sustainable development, and ensure safety and environment protection. The panellists agreed that the role of the regulator will be to safeguard consumer interests, prevent unfair trade practices, act as an adjudicatory body, and make recommendations from time to time to the government. The regulatory authority will have several linkages with the affected groups. It is essential for the government to achieve its policies while working within the framework designed for it to recommend changes and coordinate with other statutory bodies. The need for an association along the lines of the Petrofed was proposed, along with linkages with the oil companies and consumers. The structure of the regulatory authority as proposed by the panellists includes five members and a chairman, based on the recommendations of the selection committee; the tenure would be of three years, extendable by another two years. The regulatory authorities have to maintain a regional presence and will have powers under the civil court. The need for an integrated regulatory authority was debated, but, the present system was favoured by many.

Market structure

It was agreed that the key issue is providing a level playing field to all players, ensuring quality of product and services, development of access options to pipelines, ensuring product availability, controlling product prices, and ensuring energy security in a deregulated environment. The challenges in marketing lie in distribution, on account of high cost of development of new infrastructure, in adaptability of the common carrier principle for pipelines, and saturation of existing port, rail, and road infrastructure. In direct trade, there is the possibility of inter-fuel substitution and price wars will have to be tackled. In the retail, assuring product quality and developing consumer-oriented policies are important.

Tariff setting

It was pointed out that in tariff setting, the developments to date include withdrawal of the cost-plus formula and the retention pricing systems. Under the new system, tariff-adjusted import parity is selected for new refineries and adjusted import parity for existing refineries. The APM (administered pricing mechanism) is restricted to control products. Tariffs in future would remove subsidies on kerosene. A system for passing freight on to consumers is yet to be developed. Reduction of import duty on crude oil is envisaged and rationalization of duties on products is still required. For investment decisions, linkages with tariff setting is required because of the soft prices of petroleum products and to provide higher protection for new investments. If the refinery margins were to be increased, it should be based on the experience of the gas industry. The basis for setting up tariffs in the gas industry is alternative fuels consumption, adequate returns, encouraging investments, further investments, and determination of tariff methodologies such as cost identification, exit–entry methodology, long-run marginal cost model, and a detailed study of the cost of service model (used by Enron).

ure ategies

- The DGH (Directorate General of Hydrocarbons) Bill for the upstream sector has already been formulated, a natural gas regulator has been proposed, and the reports of the R Group and the ETG Group have been accepted.
- Study on the downstream regulation by TERI has been completed.
- A concept paper and bills on the downstream sector have been prepared.
- The memorandum of understanding and the agreement of understanding of Petrofed have been finalized and strategic reserves have been recommended.
- Key issues in strategizing include multiplicity of regulatory authorities, continued role of the government in various capacities, and the question of crude import parity with respect to centre and state tariffs.

As there is a lag between recommendation and implementation, there is a need to step up the pace of implementation. Long-term orientation is required in defining a clear road map of reform and to create competition in the short term. Need for guarded optimism in the benefits of liberalization is felt and policy development ought to be in tune with implementation capabilities.

Panel discussion

Transition to a liberalized environment: experiences and issues in regulation 530-539

S L Rao

There are a number of questions before the commissions including whether to promote competition, look after the consumer interest, protect the environment, promote investment, and improve efficiency. All this cannot happen at once. A transition period will be needed when tariffs might actually go up before they come down. But in that process, a great deal more efficiency and improvement in quality can be achieved.

No legislation can be perfect, particularly in India. But in India the commissions have the opportunity to draft regulations. The involvement of stakeholders and transparency are important, and are stipulated in the Act. All commissions in the electricity sector are trying to seek the involvement of experts and the public to the maximum.

Regulators must work towards self-destruction. The regulatory commissions must not become a permanent feature like so many other departments of the government. India needs to think in terms of amalgamations of commissions so that there are multi-utility commissions, and provide, perhaps in the legislation itself, for some time period over which this can happen.

As there are obvious limits to efficient regulation, the thrust should be on bringing about competition in generation and retail supply and getting multiple players in transmission and distribution of electricity. The thrust has to be on private sector involvement. While the private sector could be expected to take over even some of the existing operations over time, the need for public financing of investment during a lengthy transition period would persist.

Clearly, efficiency is the name of the game. Efficiency improvements must be part of tariff decisions. This would, to some extent, minimize the price shocks as subsidies reduce. There is increasing awareness of the need for full cost recovery. Though the allowable cost would probably be on a normative basis, there is a need to think about introducing management costing systems, and techniques like activity-based costing. This leads to the question of accounting and bookkeeping in the electricity industry. There is a huge amount of work to be done in terms of financial accounting and cost accounting. There is need for an overarching national philosophy on regulation so that all regulatory commissions have similar frameworks with specific differences depending on the industry.

Ensuring independence of the commission is very important, more so in the area of financing. How can financing of regulatory commissions be made independent (e.g., in electricity) so that the regulatory commission's expenditure on staff, etc., are not subject to constant haggling?

There is a dearth of specialists, except engineers, in the electricity industry. India does not have many economists who are working on electricity. The Institute of Cost and Works Accountants is going to start looking at electricity costing. The Institute of Chartered Accountants and management institutions, except for a couple, have not done much work in this area. Therefore, regulatory economics, regulatory accounting, and management are important areas which need attention. Similarly, consumer awareness is essential for a wider feedback.

Regarding the question of sustainable development, the electricity commissions need to look at environment in a more creative manner while determining tariffs because some part of investment is on pollution control equipment on which a return is being given. But there are also other issues such as greenhouse gases, air quality, and ugly landscapes.

There is a problem in the area of demand forecasting, and the Planning Commission which is seized with the problem is now trying to see how economics can come into demand forecasting and how forecasting time intervals can be made shorter so that there are more periodic reviews and not just five-year forecasts. But as tariffs get rationalized, T&D (transmission and distribution) losses become less, and people begin to pay more, there will be a need to reassess the demand forecasts because of the elasticities of demand.

Training for regulators and regulatory staff and departments needs a great deal of attention. Regulatory cooperation and the area in which the work of the central commission interfaces with the state commissions must get attention. The Haryana Electricity Regulatory Commission, the Orissa Electricity Regulatory Commission, and the Central Electricity Regulatory Commission are founding a national forum of regulators, which will provide a platform for this interaction. At a later stage, other regulators may join the forum to share regulatory experiences.

Devi Dayal

Petroleum is one of the key sectors of the economy which is essential for economic development and to improve the life styles of people in the country. It has already been decided to dismantle the administered pricing mechanism and to completely deregulate the entire sector by 2002. Exploration and production have been fully opened up for the private sector and they now have a level playing field with public sector oil companies. Any explorer and producer of crude oil and natural gas will get international prices for his produce. The refining sector has been fully delicensed; anyone can set up a refinery without obtaining a licence from the government. Marketing has also been partly decontrolled except for petrol, diesel, and ATF (air turbine fuel). All other products, namely LPG (liquefied petroleum gas), kerosene, lubricants, fuel oil, bitumen, etc., have been decanalized and opened up for marketing by anyone. Even petroleum products that are marketed like petrol, diesel, and ATF can be marketed by companies that have invested more than 20 billion rupees in refining and/or are producing 3 million tonnes of crude oil or crude and natural gas annually. It is the duty of the government to ensure adequate availability of petroleum products to meet the full demand throughout the country at reasonable rates and to all the sections of the society. The government has to be assisted in this and a regulatory mechanism is essential to regulate the markets in a deregulated scenario, promote investments, promote competition, prevent cartelization, and ensure transparency.

It is not feasible to have a single authority for all the activities in the petroleum sector as these activities are quite distinct from each other and the operators are also quite different. Hence, separate authorities will be more useful and will be able to perform the job assigned to them more effectively. Different roles have been conceptualized for the government regulatory body and the industry. A petroleum federation of oil companies has been proposed which will actually take up the common cause of the industry in R&D, develop new technologies, arrange finances, and deal with the common problems. As there is apprehension of this resulting in cartelization, more thought has to be given to it.

The regulatory body should be independent and the selection of the chairman and the members will be made by an independent, reliable, and objective mechanism. The panel for the appointment of the chairman and the members will be recommended by a committee consisting of the Chairman of the Press Council of India or of the PSB, the Secretary of the Administrative Reforms Department, the Secretary, PNG, the

Chief Executive Officer of the downstream oil companies, and experts. These members will have a three-year tenure, extendable by two years. Funding will be from a grant from the government as well as from acquisition of fees, fines, etc., collected by the authority itself.

The authority will have full freedom to appoint its staff, and determine their terms and conditions of service. The hearings of the commission will be public, and anybody can procure the copies of the decisions of the authority. There will be an audit by the C&AG (Comptroller and Auditor General). The annual report on the functioning of the authority and the audit report will be put up before the Parliament each year. The commission will have the judicial status of a civil court and penal provisions. The commission has also been empowered to direct the officials of the oil companies and government officials to take action for filing complaints in the courts, criminal action, and other consequential actions. This will ensure the effectiveness of the authority's independent functioning. The authorities need to be constituted under the legal framework, so the task of framing the legislation is in hand. The task of the regulatory authority for upstream, exploration and production, and natural gas has already been discussed by the Committee of Secretaries, and the drafts have been vetted by the law department too. It is hoped that these authorities enact the legislation in the coming sessions of the Parliament. The draft for the authority for the downstream sector is ready, but it has to go through the decisions at various stages of the government before it is in place. The functions assigned to the TRAI (Telecom Regulatory Authority of India) or the Central Electricity Regulatory Commission would be distinct from those assigned to this authority. It will not have powers to lay down policy. The policy will be framed by the government and announced by the oil companies. It will only monitor and ensure their effective implementation and adjudicate on issues of disputes among the different operators. It is apt that different kinds of coordination among the different regulators in the petroleum sector itself and other regulators be developed.

With regard to supply in the far-flung and disadvantaged areas, the pattern of provision of services in the north-east, for example by the Indian Airlines, could be effective. To operate in other parts of the country, they have to operate at 15% of the services in that area, and at a discount. Similar provisions could be made for supply to the hilly areas and other far-flung areas. Another solution could be to share, among all the operators in the country, the cost or the compensation of the loss in supplying to such areas. An important issue is whether the oil company should take effective and proactive action for developing consumer consciousness and promoting consumer education. This should be the essential function of the oil companies. It is recommended that this should be done with the help of academic institutions and research institutions like TERI. The authority should be set up as early as possible because the sector has already opened up.

B K Zutshi

The National Telecom Policy, 1994, although a bold step, by hindsight can be said to have been flawed in its conception as well as implementation. Apparently, its prime motivation was not promotion of competition but induction of private capital into this sector on account of shortage of public funds for the expansion of these services. Conceptually, the policy was flawed in as much as the necessary sequential steps were not taken prior to the introduction of private operators. These relate to the re-balancing of tariffs and the absence of institutional reforms, namely that of the separation of functions in the Department of Telecommunications between policy-making and provision of services, and more importantly, the absence of an independent regulatory institution. The absence of structural reform in the institutional aspects of telecommunications resulted in the implementation of the policy being in the hands of the incumbent monopoly operator, which had no incentive to promote competition.

The telecom tariff structure in India is among the most distorted in the world. The ratio between call charges for local calls and an international call being 1:300 and that between a local call and a domestic long distance call 1:150. These ratios in developed countries are nearer 1:5. TRAI (Telecom Regulatory Authority of India) has, therefore, given high priority to the re-balancing of telecom tariffs. Two consultation papers have been issued on the subject and it is expected that tariff determination exercise will be completed shortly. Another area of priority attention with TRAI has been that of sorting out interconnecting issues between service providers. This is of critical importance for the success of private operators in the sector.

In this context, what is needed in India today is a public debate on the role and place of regulatory agencies in the emerging governing structure as a result of changes in economic management. TRAI's experience is that the existing governing structure is unwilling to accommodate new structures in this area.

Another important issue which needs public discussions and public education is the current reluctance of users to pay the user charges for public utilities.

Sathyam

Regulation is essential in a monopolistic situation. It may be necessary as a transitory feature during a process of liberalization. But, there is a strong opinion that, when competition picks up, the regulatory mechanism shall wither away, or, at least, change in character to become light-handed regulation.

There is an equally strong contrary opinion that some regulation will be required even when competition picks up. Whatever may be the economic theories, there is in reality nothing like 'perfect competition'. Given the ingenuity of the human mind and the imperfections of the economic system, there will always be scope for manipulation of price and quality. From a consumer protection point of view, therefore, there will be a need in perpetuity for some form of regulation.

Even otherwise, there will always be a need for resolution of conflict of interests – public versus private; major port versus minor port, etc.

The regulatory arrangement that may need to continue in perpetuity need not be intensive or tight-fisted, it can be light-handed. It will be more appropriate for it to adopt a consultative rather than an adjudicative character.

The best justification for some form of regulation to continue even in a competitive situation will be for it to function as a catalyst of reforms. In this context, public utilities, especially those functioning in a pronouncedly monopolistic manner, that go in for inefficient use of capital, will need to be singled out for specific attention. As a catalyst of reforms, the regulator must work towards more efficient use of capital.

As regards the scope of regulation, the general feeling was that, bearing in mind the unbridled growth of minor ports, there will be need to regulate in a coordinated manner both major and minor ports.

Even within the major ports, it may not suffice to regulate only tariffs, the safety and conservancy aspects also will have to be so regulated. The need for such regulation is already recognized by the special administrative arrangement already separately erected for this purpose. It has only to be recognized that all the three aspects will require a statutory back up.

In the ports sector, tariffs are levied not only by the port authorities but also by many other operators. Port-trust-tariffs, in fact, form a minor part of the port-level expenditure. There is, therefore, a strong case for regulating the other tariffs also.

The argument that there is no need to regulate the 'other tariffs' because of the competition available may not be valid for the reason that shipping lines and the various agents at the port-level tend to catalyse. Notwithstanding the so-called competition, therefore, the 'other tariffs', especially the 'terminal handling charges' will have to be regulated.

There is no clarity emerging from the deliberations about the structure to be adopted – whether it shall be a two-tier arrangement involving the state governments (relating to minor ports) or whether it shall be one comprehensive arrangement at the national level. Also, there is no clarity about coordination between different regulators and the appellate arrangements necessary.

Whatever may be the role and function, the regulatory mechanism shall be transparent in its functioning and must be very objective. Apart from being consultative in character, the regulator shall also publish the principles to be followed and the approaches to be adopted so that all concerned will know how the proceedings will be conducted, along what lines, and subject to what parameters. The general consensus is that the regulator shall be given more powers and shall be made more autonomous. In this context, it has to be recognized that, to be fully functionally autonomous, the regulator has to be financially autonomous.

There is no clear perception in the country in general, and within the government in particular, about the concept of 'regulation'. There is, therefore, an urgent need to prepare a White Paper on Regulation. The White Paper must comprehensively address all issues relating to regulation. If at all it is necessary to distinguish between different phases of development from a controlled economy to a liberalized economy, it must clearly delineate the arrangements required in the different phases namely, 'controlled', 'transitory', and 'liberalized'.

The statutory provisions relating to the regulatory mechanism in the four sectors under focus clearly illustrate the hiatus between different statutes, the ambiguities in the provisions incorporated, and the current attitude of the government towards resolution of these problems. The government must treat these ambiguities and hiatuses as policy issues, play a positive proactive role, and take policy decisions to remove the ambiguities without waiting for them to be clarified through judicial interpretation.

It will be useful in this context to develop a model statute with incorporation of basic provisions, commonly for all the regulators. The model statute shall, to the extent possible, spell out unambiguously the role, functions, and processes of a regulator in the three identified phases.

Any regulation, especially regulation of tariffs, shall inevitably reckon with the labour component. These labour components will be governed by the provisions in the labour laws relating to industrial disputes, conciliation proceedings, etc. And, unlike in some other countries, in India we do not have labour laws for individual sectors. It will not, therefore, be possible for one sectoral authority or (even) one sectoral regulatory authority to deal effectively with the labour components so as to be able to use the tariff-leverage for effecting improvements in operational efficiency. Unless this tangle can be satisfactorily resolved, the entire liberalization process can be negated. This hurdle can be overcome only if the central government can launch an inter-sectoral national campaign to sensitize labour to the liberalization process and motivate them to accept and adopt the changes.

ser
njee

Every sector needs (1) a very clear policy strategy, (2) regulation, and (3) sequencing of reforms, with which it becomes easier to get bankable projects. Once the idea of regulation is in place, a new tribe of economists will rule. There ought to be a transitory tribe which will help in changing from a publicly controlled system to a privately competitive system. These economists will change their roles during the transition period. This is creative destruction, destroying an old system, and putting a new system in place. During this period, someone is required to take hold, command the system, and help control it. Thus there is need for a very efficient regulatory system. Serious thought has to be given to institutional arrangement because it ought to be a helping hand to the new sectors that are emerging. So there is a lot of stress on the quality of personnel. The institutional structures should be less complex. There are some generic principles of regulation. Are there advantages of inter-sectoral regulation? For example, can there be an energy regulation rather than a separate one for coal, fuel, power, etc., and are there some efficiencies to be gained from that type of regulation? Today there are power companies or ports, but projects might become much more integrated. For example, if a company has distributional strength, it might very well go into distribution of power, water, etc. So one has to address the competitive issues arising out of these cross-jurisdictional issues. The method of privatization can also create a lot of efficiency gains in how you regulate. For example, the cost-plus principle in the power sector requires enormous amount of regulation, but with a tariff bidding system, one needs less regulation. How can one actually privatize so as to minimize the regulatory requirements of the system? You can actually do it in a way that maximizes regulatory requirements! The regulatory system should be innovative, creative, and flexible. I think India deserves it and needs it. A balance has to be struck between innovation, flexibility, and creativity and the need for a framework regulation. One also needs to distinguish between regulation and supervision. The two should be separate because the methodologies for both are different. One is the consultative process, the other requires continuous dialogue.

D S Narain

Liberalization of the insurance sector is intimately linked to the areas of core sectors such as ports and telecom. There is a distinct concern for movement from an existing public sector or government level controlled mechanism to a privately operated or a competitive environment. There is also anxiety about the new players who could enter into the market – their credibility, financial standing, and their long-term dealings with the customers; and whether they are mature enough to handle the responsibility, the obligations, and expectations of the growing sector in India? Are there adequate number of players who can really fulfil this role?

Regarding the role of the regulator, the members of the Parliament are keen on knowing whether the IRA (Insurance Regulatory Authority) Bill adequately provides for the role of the regulator or whether it needs more powers in areas where the government sidetracks the authority or takes over the power as these provisions are part of the bill both for the SEBI (Securities and Exchange Board of India) and the IRA. The regulatory authority feels that the major role of the regulator in the insurance sector or the service sector when the regulator is likely to continue from the transitory to the final state would be to guide, support, and develop confidence and objectivity in dealing with the new players. The regulator will help in the long run in a few areas which are concerned with better products and better spread. If the two insurance corporations today can together mobilize 260 billion rupees in a year for investment, can a better spread over the next two to four years get them 300–400 billion rupees? The existing money could be used up by the new players too. This is the danger that existing insurers who are used to a monopoly status are worried about. Their confidence is shaken with regard to incoming competition.

The insurance or service sectors deal with awareness and if marketing is given a thrust, better awareness will be of considerable importance. Better consumer awareness means better consumer services. Consumer services are linked to costing – at what cost will the services be provided? Is there a danger of cartelization as it is emerging in the airline sector due to the paucity of players coming in? Should there be genuine services based on cost? Fortunately, in the insurance sector there are certain stipulations within the law which will enable the regulatory authority to ensure better service to the consumer. Consumer service should be ranked in terms of cost of the product and not necessarily in terms of only the services rendered which in any case is an obligation of the insurance service provider. The liberalization of the insurance sector or any sector should lead to better technical base, technical support, education, and training so that people on the job develop confidence and are able to instil it in the people who purchase the product. If the people providing the services know their job better, they will be able to develop that confidence and instil that ability in the people who purchase the product. I think these are the areas of concern for the IRA as the regulator. And we are going to be working for it and I would be definitely be very happy that we associate ourselves with any of the activities which organizations like TERI do. We would be delighted to take part in further deliberations or discussions of such bodies. I would very much like to thank TERI for the opportunity given to me to be present this afternoon.

TERI, New Delhi

R K Pachauri

Concluding remarks

Transition to a liberalized environment: experiences and issues in regulation 540-542

I will be brief because anything I add to what has been put forward will be totally redundant. As purely a research organization involved in research and training, one of our objectives in organizing this conference – apart from bringing out the major issues confronting the country and various sectors of the economy – was to arrive at some kind of a programme of action and a research agenda for ourselves.

Prof. S L Rao rightly said that regulatory commissions should set as their objective the need to self destruct. Unfortunately, as Mr Sathyam said, even that right is not available to these commissions; only the government can destroy them. So we have the first item of priority for our own research agenda and we will have to start working on some kind of a terminator gene that could be put into these regulatory bodies right from the beginning.

I now want to address a few issues which deal with the follow-up of this conference. We take very seriously the suggestions put forward that a White Paper should be produced on regulation as a whole. We will be in touch with Mr Sathyam and the other distinguished persons who have helped us in seeing how this could be done. And I will request Mr Sundar and my colleague, Dr Leena Srivastava, to take the initiative in bringing this about.

We will also bring out the proceedings of the conference. This will serve the larger purpose of dissemination and make available to a much larger audience what was said here.

The suggestions about model statutes to look at some of the labour implications have to be taken into account. The whole process of privatization and the functioning of regulatory bodies could be jeopardized by the fact that we have large surpluses of labour. The entire initiative could become so politically unpopular that we will be frozen in our tracks. I hope we can tackle this issue in some way.

If so many different ministries and agencies are working on setting up regulatory commissions and giving them terms of reference, we might have several commissions treading on the toes of others. We need to be very clear about what we do at the central and state levels. This is an important issue that the White Paper should address. How do we ensure that we do not have a tribe which grows like hydra and only creates problems for everybody? As was pointed out, we should not have a new breed of magistrates who exceed the brief of the existing magistrates in the system. The reason why we set up the Regulatory Studies and Governance Division at TERI is because we see the challenges of research and intellectual effort, and we have also seen that several such efforts that have taken place in the recent past have not been supported by the kind of intellectual exercise that was required. I am not saying that anybody, any research institution in particular, has any superior knowledge to make this a more enlightened process, but I think we need to set up a process of interaction with those who are practitioners and those who are in the business of research. And for this reason, as Mr Sundar has mentioned on several occasions, we hope to set up a relationship with all those involved in the business of regulation and also those who are going to be involved in the business of being regulated. I hope that everyone who has attended the conference supports this thought.

We need to organize a conference of this nature annually because I think things are going to move very rapidly; if they do not move rapidly, there is all the more reason to hold a conference of this nature. We are delighted at the fact that we were able to attract some of the most senior regulators and commissioners from other countries and I think their experience is vitally important to us. We hope that in the future we can count on the same kind of inputs and support from them as well as others.

I am not going to get into any issues of an academic nature, but the Honourable Minister for Communications, Mr Jagmohan, did make the point during the inaugural session that whatever regulatory bodies do has to be accepted by the public. I think that is a vitally important issue and that we need to sensitize the public. We need to bring out a lot more information products that can create an understanding of what regulation is all about. We need to ensure that the public understands it, sees the benefits of it, and also sees some of the downsides that may be associated with it.

Lastly, one would have to create an enormous amount of expertise. There is a great danger that one may be recycling personnel drawn from a diverse set of backgrounds into regulators and regulatory specialists. Unless they are equipped with the right level of expertise and have the tools and techniques of regulation worked out, we are in for a very difficult time. Here again, I would submit to and endorse the spirit in which Prof. Rao has put forward this thought. There is a need for linking up regulatory bodies with specialist organizations and individuals outside. This will enrich the process, help the country enormously, and ultimately help the public and the consumer.

Not going into a detailed listing of persons to whom we owe deep gratitude, I want to thank you all. I want to thank you sir, Prof. Alagh, the person who has always helped whenever we needed his presence. Whenever we needed his wisdom and advice, he has been there, and I hope we can continue to count on that for all time to come.

Thank you very much.

TERI,
New Delhi

S K Sarkar

Vote of thanks

Transition to a liberalized environment: experiences and issues in regulation 543–544

Honourable chairman, Prof. Y K Alagh, eminent panellists, distinguished delegates, and friends. It is my pleasure and privilege to propose the vote of thanks at the close of the two-day national conference. This national conference has been a landmark in many ways, particularly in that it is the first time in India, and perhaps in this part of the world, that such a conference has been organized. Dr Pachauri has already delineated the conclusions of the conference.

I would only like to add to that by saying that we will consolidate the advice given by the honourable chairperson and other distinguished panellists. My thanks are due to all those who have contributed so generously to making this conference a success. At the very outset our heartfelt thanks go to the Honourable Minister for Telecommunications Mr Jagmohan, who graciously consented to inaugurate this conference. We are thankful to Prof. S C Littlechild for his thought-provoking keynote address. Our special thanks go to the chairperson of this session and all chairpersons who guided the discussion in our 20 sessions over the last two days. Our thanks go to the distinguished panellists of the last two days, who have come from 12 foreign institutions and about 40 premier institutions in India, for their thoughts and views. Our thanks also go to the distinguished participants without whom the discussions would not have been successful. We thank various sponsors to our programmes, specially the Central Electricity Regulatory Commission, Orissa Electricity Regulatory Commission, Hindustan Petroleum, Cellular Operators Association of India, Department for International Development, and HSBC Investment Banking. We specially thank the Telecom Regulatory Authority of India and the Tariff Authority for Major Ports for their participation in our conference. We also thank the Indian Ports Association for its guidance during the last few months. We are specially grateful to the Infrastructure Development Finance Company Ltd for guiding us from the very beginning on how to make this conference a success. I shall be failing in my duty if I do not thank the Steering Committee for this conference, chaired by

Prof. S L Rao, for its continuous guidance. Our thanks go to the reporters who are the eyes and ears of this conference and also the persons who have participated in the issues over the last two days for our conference. Our thanks go to all our staff for their enthusiastic execution of all processes associated with the conference. There has been such a wide-ranging participation in the conference that I seek sincere apologies if I have omitted to mention of anyone who has also helped to make the conference fruitful. Thank you.

Index

Transition to a liberalized environment: experiences and issues in regulation 545-572

1956 Amendment: Indian Electricity (Supply) Act, 1948 94
1959 Amendment: Indian Electricity Act, 1910 95
1991 Amendment: Indian Electricity (Supply) Act, 1948 95
1991 Amendment: Indian Electricity Act, 1910 95
2-stroke engines 459

Above-cost tariffs 373
ACA (Australian Communications Authority) 330, 406, 407, 408
ACCC (Australian Competition and Consumer Commission) 242, 245–249, 270, 395–405, 407, 408, 505, 507–510, 513–515
Access
  arrangement 510
  charges 370
  code 404
  issues 404
  networks 347
  prices 506
  pricing 403
  pricing principles 404
  prohibition 513
  provider's network 403
Accountability 40, 42–44, 50, 81, 82
Accounting
  costs 83
  framework 83
  principles 192
  standards 66
ACT (Australian Capital Territory) 243–245, 248
ACT Water and Electricity Authority (*see* ACTEW)
ACTEW (ACT Water and Electricity Authority) 243
Activity-based costing 530
Adani Port 285
ADB (Asian Development Bank) 108, 471
Administered pricing mechanism (*see* APM)
Administrative Reforms Department 532
Administrative Staff College of India (*see* ASCI)
Administrative
  and monetary penalties 493
  procedures 192
  process 306
  reform 241
Africa: cellular tariff 376
AGA (Australian Gas Association) 505
Agricultural
  consumption 83, 122
  policies 113
  sector 74, 77, 83, 84
  tariff: electricity 196
Agriculture tariffs 483
Air turbine fuel (*see* ATF)
Airtel 382
Alcatel 382
Alternative
  access technology 400
  energy sources 115
  fuels 426, 471
  infrastructure 357, 358
  licensing options 327
Aluminium 65
  ingots 299
  raw materials 304
Americas: cellular tariff 376
Andhra Pradesh Electricity Reform Bill 74, 109
Andhra Pradesh State Electricity Board (*see* APSEB)
Annual recurring expenditure 370
Anti-competitive
  collusion 359
  conduct 395–398, 402
  download price 400
  exclusive dealing 405
  impact 402
  practices 423
Anti-trust issues 335
APGENCO 75
APGPCL 75
APM (administered pricing mechanism) 411, 412, 415, 431, 440, 441, 453, 466, 479, 481, 482, 498, 529, 532
Appellate
  arrangements 536
  bodies 51
Appleton Dock 300, 301
APSEB (Andhra Pradesh State Electricity Board) 74, 226
APTRANSCO 75
AR (average revenue) 292–295
  cap 292
  price caps 292
Arab oil-producing nations 115

- Arbitrary fixation: fares 308
- Arbitration determination 513
- Artificial control 452
- ASCI (Administrative Staff College of India) 108, 226
- Asia: cellular tariff 376
- Asian Development Bank (*see* ADB)
- Asian
  - economies 482
  - region 517
- Asia–Pacific region 322
- Asset
  - base 208
  - building 393
- Asymmetrical network 403
- ATF (air turbine fuel) 457
- Atmospheric pollution 228
- Atomic Energy Department 76
- Audio and video-text services 321
- AUSTA Electric 243
- Australia
  - economic activities 240
  - energy needs 240
  - gas industry 514
- Australian Bureau of Agriculture and Resource Economics 246, 505
- Australian Capital Territory (*see* ACT)
- Australian Communications Authority (*see* ACA)
- Australian Communications Industry Forum 408
- Australian Competition and Consumer Commission (*see* ACCC)
- Australian Competition Tribunal 406
- Australian Gas Association (*see* AGA)
- Australian
  - consumers 505, 506
  - economy 240
  - electricity industry 249
  - electricity supply industry (ESI) 240, 241–244
  - energy assets 240
  - gas reform 505–515
  - industries 241, 506
  - port authority 265
  - regulatory regime 408
- Automotive industry 307
- Autonomous regulation 41
- Autonomy 43, 49, 81, 108, 109, 498
- Availability-based fixed charges 200
- Average revenue (*see* AR)
- Aviation turbine fuel (*see* ATF)

- Base rate 191, 192, 194, 195
- Base-load
  - cluster 195
  - hours 195
- Basic
  - operators 351
  - services 335, 336, 359
- Basslink
  - interconnector 248
  - project 244
- Bedi port 285
- Behaviour regulation 470
- Bell Operating Company 363
- Below-cost rentals 373
- Benchmarking programme 196, 236
- Bernard Tenebaum 108
- Berth 300, 301
  - hire 291, 298, 304
- Bharat Petroleum Corporation Limited (*see* BPCL)
- Bharti Telenet Ltd 329
- BHP Steel 287
- BICP (Bureau of Industrial Costs and Prices) 65, 66
- Biddable cost recovery limit 414
- BIFR (Bureau of Industrial Finance and Restructuring) 28
- Big bang approach 87, 88
- Billing determinants 220
- BIS (Bureau of Indian Standards) 488, 489
- Bitumen 491, 532
- Bongaigaon Refineries and Petrochemicals Ltd (*see* BRPL)
- BORL 465
- Boston Edison 363
- Boston Transit Authority 185
- BOT (build, operate, transfer) 310
- BPCL (Bharat Petroleum Corporation Limited) 444, 464
- BPSA (bulk power purchase/supply agency) 133–135
- Break-even periods 380
- Breakwater Pier 301
- Brisbane Port Authority 274
- Brisbane Ports Corporation 266
- British Airports Authority 57, 58
- British Approvals Board for Telecommunications 330
- British electricity industry 9, 10
- British Gas 445
- British Telecom 10
- Broadcasting
  - content issues 335
  - industries 323, 326
- BRPL (Bongaigaon Refineries and Petrochemicals Ltd) 464
- BSES Limited 76
- Budgetary
  - appropriation 485
  - independence 332
  - process 41
  - transfers 81
- Bulk power purchase/supply agency (*see* BPSA)
- Bulk
  - goods 298
  - operators 260
  - power 114
  - supply 100, 141, 151, 152
  - supply licence 152
  - supply tariff 133, 136
- Bureau of Indian Standards (*see* BIS)

Bureau of Industrial Costs and Prices (*see* BICP)
Bureau of Industrial Finance and Restructuring (*see* BIFR)
Bureau of Transport and Communications Economics 266
Burmah Shell 411

C&AG (Comptroller and Auditor General) 50, 533
Cable
  monopolies 364
  television 362
  TV operators 326
CAC (Central Advisory Committee) 43, 44, 48–52, 110
CAGR (compound annual growth rate) 76, 483
Calcutta Electric Supply Corporation (*see* CESC)
Caltex 411
Canadian
  Radio-television and Telecommunications Commission 330
  regulator 423
  regulatory perspective 365
Capacity
  building 225
  pipeline 422
Capital
  assets 203
  base 202, 207, 208, 512
  construction 269
  contributions 512
  costs 234
  equipment cost 380
  investment plans 516
  markets 389
  redundancy 512
  resources 351
  restructuring 208
  services 193
  structure 203
  structure mix 222
Captive
  customers 186
  port facilities 285
  power plants 70, 73, 78, 152, 154
Carbon storage 500
Cargo 290, 298, 300, 303, 304, 307, 314, 523
  berths 258
  charges 302
  crossing 265, 267
  movement 259
  services 306
  storage 265
  traffic 259
  chemical 279
Cargo-based charges 267
Cargo-handling equipment 263
Cargo-marshalling facilities 289, 291
Cargo-related charges 259
Carriage service providers 397, 408
Cartel formation 429
Cartelization 41, 47, 438, 485, 532
Causal incremental cost 349
CDMA (code division multiple access) 382
CEA (Central Electricity Authority) 39, 69, 94, 96, 109, 122
Cellular markets 360
Cellular Operators Association of India 543
Cellular mobile
  networks 322
  telephone services 321, 322
Cellular
  operators 351, 355
  price structure: current 360
  services 326, 329, 355, 356, 384
  tariffs 376
  telephone services 321, 322, 327, 364, 372
Central Advisory Committee (*see* CAC)
Central Electricity Regulatory Commission (*see* CERC)
Central
  and state regulators 201, 206
  electricity generating board (UK) 10, 11
  fund agreement 366
  generating companies 71
  generating stations 75, 200
  legislation 126
  Ordinance 102
  regulators 61, 201, 206, 425
  regulatory authority 442
  sector power corporations 75
  transmission unit 21, 1213
  utilities 206
Central government 31, 35, 39, 70–72, 75, 79, 103, 337, 425, 523
  agencies 312
  generators 203
Centralized generation plants 235
Centre of High Technology 488, 489
CERC (Central Electricity Regulatory Commission) 29, 43, 44, 48–53, 70–72, 91, 104, 105, 109, 126, 199, 226, 239, 250, 252, 257, 262, 428, 488, 489, 521, 522, 531, 533, 543
CESC (Calcutta Electric Supply Corporation) 76
Channel usage 290
  charges 291
Chief Controller of Explosives 419
Chinese government 286
Civil Aviation Authority 58
Clean alternative fuel 468
Clearing and handling agents 313
Client-centred research 35
COAG (Council of Australian Governments) 241
Coal Board, Israel 195
Coal 145, 500, 522
  consumption 188
  industry 12, 13
  loading 269
  price 195
  supply 236

  transportation 236
Coal-based electricity generating units 188
Coal-bed methane policies 474
Coastal
  general cargo trade 303
  refinery tankages 455
  shipping 277
  shipping freight rates 276
  vessels 304
Cochin Port Trust 264
Cochin Refineries Ltd (*see* CRL)
Code division multiple access (*see* CDMA)
Coehlo Committee 204
Combined cycle power plants 59, 236
Commercial
  autonomy 147
  berths 287
  conflict 183
  interests 316
  norms 316
  principles 88
  viability 107, 147, 148
Committee of Secretaries 533
Committee on Private Sector Participation in Power 204
Common Minimum National Action Plan 70
Common
  carriers 420, 421, 516, 517
  cost 371
  regulatory authority 442
  technical infrastructure 351
Commonwealth 507, 509
  bodies 507
  legislation 507
Communication sector 325
Community service obligation (*see* CSO)
Compact fluorescent lamps 234
Companies Act 75, 284
Department of Company Affairs 151
Company law board 28
Compensation and personnel policies 357
Competition Policy Reform Act (Australia) 270
Competition 107, 108, 114, 116, 117, 130–132, 137, 138, 142, 146, 259, 267, 327, 377, 387, 388, 393, 400, 401, 403, 404, 417, 419, 445, 466, 483, 485, 497, 501, 532
  and choice in electricity 137
  model 148
  notice 396, 398, 400, 402
  policy 210, 387
  policy enforcement 359
  rule 395–398
  generation 138
  promotion 396, 405, 456
Competitive
  benefits 351
  bidding 130, 144, 426, 443
  billing service 186
  capacity 509
  economy 45
  electric supplier 184
  electricity industry 183
  electricity pool 242
  environment 96, 125, 126, 326, 349, 483, 505
  equity 349
  markets 14, 97, 118, 120, 145, 146, 151, 316, 359, 362, 366–368, 412, 512
  metering service 186
  multi-operator environment 346
  neutrality 267
  oil market 484
  parity rules 404
  ports 306
  power producer 186
  public voice services 347
  reforms 505, 506
  regime 359
  regulation 335
  segments 366
  services 348
  supplier licensing 185
  tariffs 310
  telecommunication services 346
  workforce 503
Competitively-priced generation 116
Compound annual growth rate (*see* CAGR)
Comptroller and Auditor General (*see* C&AG)
Conceptual Issues 153, 154
Conduit regulation 340
Conservation
  energy 227, 230, 232
  petroleum resources 492
  resources 427
Consolidated Fund of India 49
Constitution of India 69, 99
Constitution: advisory boards 93
Construction
  period 390
  risk 471
Consumer Education and Research Centre 225–227
Consumer price index (*see* CPI)
Consumer
  associations 214
  awareness 531, 539
  base 76
  benefits 22
  choices 40
  distribution grids 188
  education 87
  empowerment 224
  grievances 46, 73, 198
  groups 113, 226, 227
  interests 40, 41, 46, 48, 338, 437, 440, 446, 461, 484, 489, 516
  involvement 500
  orientation 517
  protection 48, 107, 147, 148, 325 , 396, 429, 443
  rights 73
  selection 130
  service 110, 111, 539
  tariff 122
Consumer-oriented policies 528

Consumption
  pattern 197
  rate 189
  coal 188
  crude oil 188
  electricity 197
  energy 219
Container
  berth 310
  cargo 287
  corporations 278, 313
  freight system 310
  port 287
  terminals 258, 310, 311
Containerized cargo 302
Contract carriage 421
Contracted market 388
Contracting party 421
Contractual
  arrangements 511
  commitments 133
  sales 514
Contribution framework 366
Controller of Insurance Act, 1938 31
Conventional
  power system 231
  regulation 365
Cooperative federalism
  approach 36
  standards approach 37
Corio quay 304
Corporate
  plans 267
  structures 463
Corporatization 149, 284, 312, 316
  public sector undertakings 498
Corporatized firms 388
Corruption: reduction 147
Cost allocation 202
  methodology 219
Costs
  allowability 198
  recognition 365
  unbundling 372
  discovery process 65
  identification 529
  methodology 84
  norms 200
  of production 195
  of service 219, 220
  of supply 122, 130, 139, 209, 211, 229
  principle 190
  recovery 306
  reductions 139, 235
  separations 367
  structure 360
  tariffs 146
  electricity 236
  power 92
  power plant construction 187
  product 539
  service 512
  service model 529
  supply 113
Cost-based
  prices 348
  pricing 305, 372
  study 371
  tariff 106, 306, 325, 369–371
Costing
  methodology 371
  principles 373, 404
Cost-plus
  approach 261
  formula 528
  method 82
  system 482
Council of Australian Governments (*see* COAG)
CPI (consumer price index) 187, 195, 292, 293, 522
Criminal Penal Code (*see* CrPC)
CRL (Cochin Refineries Ltd) 464
Cross-country pipelines 432, 459, 469
Cross-jurisdictional issues 537
Cross-ownership 423
Cross-sectoral issues 500
Cross-subsidies 63, 66, 70, 72, 77, 113, 137, 145, 146, 154, 190, 192, 198, 201, 224, 373, 416, 522
Cross-subsidization 19, 145, 154, 186, 210, 236, 365, 366, 368, 369, 371
CrPC (Criminal Penal Code) 44, 51
Crude 417, 418, 432, 460
  import 417, 418
  import duties 517
  oil 188, 302, 303, 414, 416, 442, 464, 479, 480
  oil consumption 188
  oil exploration 464
  refining 432
  sales agreements 414
  supply 441
CSO (community service obligation) 272
Current production: natural gas 444
Customer
  demand 115
  focus 458
  interface potential 352
  satisfaction 325
  service 457, 460
  service standards 353
  support system 189
Customers: uniform treatment 192
Customs procedures 280

Dabhol
  captive port facilities 285
  power project 445
Dahej: captive port facility 285
Data
  bank 494
  network 329
  requirements 85
  services 321
Databases 349
David Matin Roodman 112
Dealership network 419
Debt
  equity ratio 203, 296
  repayment commitments 314
Decanalization 491, 498
Decentralized electrification 229, 231

Decentralizing
  distribution 153
  distribution and retail supply 153
  retail supply 153
Decision-making process 40, 192, 502–504
Decontrol
  gas sector 420
  petroleum sector 416,
  refining 416
Deep water basins 441
DEL (direct exchange line) 322, 328
Delegated legislative authority 184
Delhi Science Forum 337, 339
Demand
  forecast 219
  projections 385
  electricity 104, 115, 139,193
Demand-side
  management 80, 152
  pricing 373
Demand–supply
  gap 198
  gap: energy 199
  potential 444
Demonopolization 330, 331
Demurrage charges 280, 315
Department for International Development, UK 543
Department of Atomic Energy
Department of Company Affairs 151
Department of Energy Organization Act, USA 114
Department of Telecommunications (*see* DoT)
Deregulated
  environment 482, 485, 488, 528
  industry 417, 516
  market 483
  oil sector 461
Deregulation 57, 107, 321, 362, 411, 412, 416, 433, 434, 456, 482–484, 486, 491, 496, 516
Detention charges 280, 315
Developing
  countries 20, 130, 131, 356
  markets 346, 348
Development
  management 228
  electricity 93
  infrastructure 321
  network 370
  telecom network 368
  telecom sector 369
  telecommunications 361
Developmental activities 444
DGH (Directorate General of Hydrocarbons) 413, 415, 427, 489, 496, 529
Dhamara Port 285, 311
Direct exchange line (*see* DEL)
Directorate General of Hydrocarbons (*see* DGH)
Directorate General of Shipping 39, 255
Disinvestment 46, 469, 471
  commissions 28
Dissemination: information 46, 87, 91
Distributed generation 229, 234, 235
Distribution 7, 11, 16, 20, 45, 73, 74, 76, 78–80, 88, 89, 100, 105, 107, 111, 112, 115, 120, 121, 123, 125, 132, 135, 137, 141–143, 146, 148, 149, 151–153, 202, 204, 205, 213, 243, 251, 352, 411, 416, 472, 493
  and supply 251
  business 73, 75, 123
  channels 433
  charges 495
  codes 149, 154
  companies 133–136, 138, 140, 143, 149–153, 235, 242, 495
  customers 140
  functions 132, 149
  infrastructure 123
  losses 122, 125
  networks 125, 126, 426
  process 252
  regulator 505
  sector 205, 426
  side 125
  system 58, 74, 122, 136, 149, 189, 363
  tariff 73
  utilities 206
  zones 74, 133
  electricity 95, 121
  gas 443
Diversity
  generation technology 236
  optimization 236
Haldia Dock Complex 310–311
Dock Labour Board Act 312
Dock labour boards 39
Dock Workers (safety, health and welfare) Act, 1986 39, 255
Domestic
  consumers 7, 82
  crude oil 412
  customers 13, 14, 16, 145
  debt 482
  demands 506
  gas 495
  long-distance traffic 323
  partners 355
  political environment 501
  product 240
  product elasticity 411
  production 413
  sector 231
  tariffs 483
DoT (Department of Telecommunications) 19, 20, 39, 44, 322–325, 328, 330–333, 337–339, 351, 355–360, 369–371, 373, 383, 384, 526, 527
Download charge 400
Downstream
  hydrocarbons sector 416

  markets 506, 508
  petroleum activities 439
  petroleum sector 413, 416
  refining 442
  reform 513
  regulation 529
  sector 415, 484, 493, 516
  utilization industry 472
Draft Telecom Policy 1999 352, 384
Drilling expenditures 414
Dry bulk 304
DSM (demand-side management) 234, 235, 237
Duopoly market structure 355, 387

E&P (exploration and production) 411, 415, 427, 441, 481, 482, 489, 490, 497, 498, 516
Easement rights 427
East Jerusalem Electric Corporation 188, 189
EBAs (enterprise bargaining agreements) 272
EC (European Community) 330, 331, 360
Economic
  and accounting principles 192
  challenges 501
  development 90, 106, 145, 148, 225, 368, 472, 484, 532
  efficiency 143, 349, 522
  efficiency and competition 496
  growth 69, 202, 238, 321
  investment 348
  liberalization: India 483
  modelling 505
  monopolies 224
  policies 95, 321
  position papers 191, 192
  power supply 104
  pricing 63, 483
  principles 191
  principles: regulation 192
  reform process 321
  regulation 146, 147, 238
  research 486, 499
  returns 505
  Survey 63
  use: resources 112
Economically
  deprived sections 416
  vulnerable sections 481
Economics
  and Accounts Division, Israel 191
  refining 431
Effective regulation 402
Efficiency 85, 107, 112, 144, 148, 224, 240, 530
  coefficients 192, 195, 196
  improvement 522
  investments 83
  distribution 147
  freight transport 305
  generation 147
  India 238
  operations 198
  transmission 147
Efficient
  policies 105
  regulation 530
  trading 118
EIRP 465
Electric
  distribution networks 115
  energy 115, 137
  generation 185
  industry 115, 119, 120
  market 119, 120
  power 78, 83
  power generation 116
  power reforms 198, 228
  power sector 238
  power systems 137
  power utilities 198
  restructuring 363
  supply lines 94
  traction 94
  transmission 117, 120
  utilities 115, 117, 119
  utility bills 36
  utility industry 115
Electricite de France 141
Electricity (Supply) Act, 1926 (UK) 94
Electricity (Supply) Act, 1948 39, 70, 76, 82, 93, 99, 102, 111, 128, 143, 199, 200, 202, 204, 207, 210, 250
Electricity Industry Law 1996 187, 189
Electricity Laws (Amendment) Act, 1991 199
Electricity Laws (Amendment) Act, 1998 211, 213
Electricity Regulatory Commission (*see* ERC)
Electricity Regulatory Commissions Act, 1998 43-45, 48, 79, 96, 100-102, 104, 105, 112, 151, 198-201, 209, 233, 238, 250, 258, 521
Electricity Trust of South Australia (*see* ETSA)
Electricity 15, 19, 34, 58, 64, 71, 75-80, 83, 91, 93, 94, 106, 113, 115, 118, 137, 145, 154
  boards 79, 99, 125, 133, 136
  companies 15
  companies: investor-owned 185
  consumers 233, 236
  consumption 77, 197
  cost 235, 236
  demand 104, 115, 139,193
  distribution 95, 121, 238
  distribution companies 363
  generating units 188
  generation 95, 188, 238
  generation market 116
  generator company 243
  grid 192
  industry 7, 17, 69-71, 75, 78-80, 100, 102, 104-106, 108, 188, 241, 251, 287, 521
  industry restructuring 43, 183
  markets 116
  pool 11

  prices 82, 83, 115, 240
  privatization 9
  production 82, 137, 188
  production ratio 188
  quality 190, 193, 197
  rates 115, 192
  reform 240
  regulation 200
  regulator 41, 108, 244
  restructuring 185
  restructuring filings 184
  sector 9, 78, 99, 113, 233, 411
  services 87, 187
  supply 9, 89, 93, 105, 111, 233
  supply chain 192
  supply companies 153
  supply industry 55, 235, 240
  tariff: conceptual issues 152
  tariffs 48, 72, 77, 82, 100, 105, 195–197, 200, 235
  transactions 183
  transmission 238
  use 93
  users 237
  utilities 241
  competition and choice 137
  theft 122
Emergency reserve 418
Emissions and pollution 448
Empowered regulator 340
End conversion losses 229
Energex 243
Energy Policy Act, 1992 (see EPACT)
Energy 75, 83
  audits 230
  charges 53
  conservation 227, 230, 232
  consumption 219
  Control Consultants 200
  costs 139
  demand–supply gap 199
  efficiency 233
  facility siting 185
  forms 489
  industries 22, 114, 120
  needs 84
  needs: Australia 240
  policy 422
  prices 36, 145
  pricing 84
  production 59
  regulation 22, 114
  regulators 120
  regulatory issues 22
  resource mobilization 238
  sector 84, 443, 469
  security 497
  services 120
  shortage 69
  sources 229
  supply 93, 115, 212, 234
  tariff 198
  use 93
Energy-efficiency
  measures 185
  equipment 230
Energy-intensive industries 240
Enforcement: competition policy 359
Engineering and Customer Service Division 192
Engineering improvements 137
Engineering-based organization 352
Enron 445
Enron Oil and Gas India Ltd 464
Enterprise bargaining agreements (*see* EBAs)
Environment 250, 281, 429, 442, 460, 463, 484, 488
  protection 227
  preservation 494
Environmental
  agencies 145
  commitments 105
  compliance 61, 233
  constraints 234
  contamination 429
  cost accounting 202
  costs 316
  damage 349
  guidelines 493
  impact assessments 279, 428
  norms 236
  obligations 316
  pressure 228
  regulations 61, 71, 145, 236
  regulatory agencies 71
  standards 60, 61, 417, 422, 493
Environmentally benign policies 48, 105
EPACT (Energy Policy Act 1992) 116
Era Sezhyan Committee on Life Insurance 227
Ergon Energy 243
ESCOs (energy service companies) 231
ESI (electricity supply industry) 240–244
ESSAR Comvission 329, 382
Essar Oil Ltd 465
Essential Commodities Act, 1955 427
ESSO 411
Esso/BHP Petroleum joint ventures 287
Ethane 468
ETSA (Electricity Trust of South Australia) 243
Europe: cellular tariff 376
European Community (*see* EC)
European Union 130, 131, 469
European
  countries 469
  governments 470
EWGs (exempt wholesale generators) 116
Exchange
  rate 194
  risk 471
Exchange-risk protection 207
Exclusive economic zones 427
Exempt wholesale generators (*see* EWGs)
Exit–entry methodology 529
Exploration and production (*see* E&P)

Exploration 444, 468, 513, 532
  activities 428
  bids 498
  licences 414, 442
  period 414
  crude oil 464
Export: gas 424
External debt markets 312

Facilities access code 405
Facilities-based
  competition 348, 357, 358, 363
  suppliers 357
Facility hire rate 304
Fair trading 396, 405
Fast-track approval route 404
FCC (Federal Communications Commission) 34, 38, 330, 363
Federal Communications Commission (*see* FCC)
Federal Energy Regulatory Commission (*see* FERC)
Federal Power Act 1935 114, 115
Federal Power Commission 114
Federal Telecommunications Act 1966 363
Federal
  agencies 60
  budget 239
  commissioners 34, 38
  Court 395, 396
  government 36, 37, 38, 115
  legislation 37
  regulations 120
  regulators 120
Federal–state universal service joint board 37
FERC (Federal Energy Regulatory Commission) 5, 22, 34, 114, 116–120, 130, 183, 469, 477
Fertilizers 65, 287, 299, 304, 468, 472, 491
Fibre optic capacity 364
Fibre optics systems 363
Financial
  accountability 267
  advisers 355
  and economic position papers 191
  autonomy 109
  capability 421
  closure 327, 388
  engineering 236
  instability 77
  institutions 59, 313, 380, 524
  market 47
  mismanagement 40
  non-viability 233, 328
  norms 379
  options 383
  performance 267
  pre-qualification 336
  reforms 269
  resource mobilization 238
  resources 89
  returns 296
  viability 81, 85, 86, 107, 147, 198, 233, 234
Financially viable utilities 198
Financing costs 380
Fiscal
  deficit 63, 482
  management 341
  problems 63
  regimes 441
  stability provision 414
Fishermen's wharf 298
Fishing vessels 298, 299
Five-Year Plan 27, 283, 444, 483, 523
Fixed
  assets 194
  charges 200
  common costs 349
  cost environment 372
  costs 305
  network 346
  payments 192, 196
  resources 305
Flat-rate tariff structure 83
Floating currency 482
Fluctuations: tariffs 194
FMC (Forward Markets Commission) 27
FOB (free on board) 447
Forecast: demand for electricity 122, 192
Forward Markets Commission (*see* FMC)
Foreign
  currency reserves 496
  direct investment 383
  equity participation 383
  exchange 65, 314
  exchange markets 65
  exchange reserves 496
  investments 63
  oil companies 411, 481
  operator 382
  partners 383
  ports 283
  stake 383
  trade 310
  vessels 304
Fossil fuels 116, 228
FPA (Fremantle Port Authority) 273
Framework regulation 151, 538
Free
  access: information 224
  competition 351
  trade products list 437
Free market
  environment 440
  rewards 452
  situation 451
Fremantle Port Authority (*see* FPA)
Frequency-linked availability tariff 200
Fuel
  cost 187
  efficiency 308
  oil 425, 426, 441
  oil parity 425
  pressure 502
  programmes 145
  security 424
  suppliers 97
  usage 448

Fuels 123, 145, 187, 194, 424, 448, 472, 478, 532
Functional unbundling 116
Functionally autonomous 536
Funding
  agencies 106
  mechanism 326
  infrastructure projects 314
Furnace oil 491

GAIL (Gas Authority of India Limited) 426, 444, 468
Gangavaram: port facilities 285, 311
Gas 15, 34, 422, 447, 448, 468, 472, 473, 490, 505, 513, 514, 516
Gas Authority of India Limited (*see* GAIL)
Gas Pipelines Access (Commonwealth) Law 1998 505, 507, 509
Gas
  basin 514
  chain 471
  demand 444
  distribution 443
  distribution sector 474
  distributors 422, 426
  fields 415, 422
  imports 498
  industry 420, 421, 448, 471, 474, 505, 506
  industry reform 506
  industry: Australia 514
  industry: India 468
  markets 469, 506
  pipeline projects 471
  pipeline tariff 476
  pipelines 470, 505, 507
  plant 477
  price 420
  producers 425, 514
  purchase costs 478
  reforms 506
  regulation 443
  regulatory act 497
  regulatory authority 448
  regulatory body 435, 488
  sector regulation 420
  supply 15
  supply infrastructure 471
  T&D (transmission and development) 421, 473
  transactions 183
  transportation 420–422, 443, 469, 470
  transporters 422, 425
GDP (gross domestic product) 63, 496
GDP growth 328
GEB (Gujarat Electricity Board) 74
Geelong Port 287–289, 293, 296, 304
Geelong Port Authority 296
Gellibrand Pier 301
General cargo port 288
General Insurance Business (Nationalization) Act 1972 48
Generated electricity: pool 236
Generating
  agencies 132
  capacity 77
  companies 71, 72, 98, 133, 134, 136, 149, 233
Generating-plant divestiture transactions 186
Generation
  assets 149
  business 72
  capacity 70, 122, 203, 235
  companies 129
  cost 131
  diversity 236
  level 131
  mix 234
  payment 231
  projects 75, 123, 204
  electricity 95, 188
Generation-divestiture proposals 186
Generator companies 243
Generators 11–13, 128, 130, 131, 138, 140, 144, 149, 152
Generic
  model access 346
  models 78
  principles: regulation 537
Gladstone Port Authority 274
Global Mobile Public Communication System (*see* GMPCS)
Global system for mobile communication (*see* GSM)
Global
  climate change 500
  competitiveness 321
  cost minimization 234
  liberalized environment 501
  markets 331
Globalization 108, 312, 371
GMPCS (Global Mobile Public Communication System) 323, 326, 329
GMPCS service providers 323
GNP (gross national product) 61, 188
Government of Gujarat 74
Government of Haryana 74
Government of India 69, 89, 93, 97, 104, 106, 121, 200, 203, 206, 255, 286, 356, 358, 382, 411, 413, 416, 418, 420, 433, 435, 444, 468, 474, 479, 482, 496
Government trading enterprises (*see* GTEs)
Government
  budgetary allocations 313
  controls 481
  departments 52
  enterprises 241
  funds 148
  holdings 484
  monopoly 351
  ownership 58
  policies 77, 368, 461, 485
  regulation 424
  regulators 39
  sector 121
  subsidy programmes 149
  control 108
  regulatory system 190
Government-owned
  ports 524
  utilities 113

Graham Shuttleworth 137
Green electricity 522
Greenfield
  capital commitments 355
  project 358
  sites 278
Grid Corporation of Orissa Ltd (*see* Gridco)
Grid
  codes 149, 154
  company 150
  conditions 200
  discipline 232
  schemes 94
  security 97, 200
  system 94
Gridco (Grid Corporation of Orissa Ltd) 73, 153–156, 207
Gridcos 117
Grid-wide tariff 118
Gross domestic product (*see* GDP)
Gross fiscal deficit 496
Gross national product (*see* GNP)
GSM (global system for mobile communication) 382, 407
GTEs (government trading enterprises) 273
Guidelines on Negotiated Settlement 423
Gujarat Electricity Board 74
Gujarat Electricity Regulatory Commission 74
Gulf war 496

Haldia port 310, 312
Handling agents 313
Harbour Act, 1964 286
Harbour towage 266
Haryana Electricity Board 73
Haryana Electricity Reform Act 73
Haryana Electricity Regulatory Commission 73, 104, 226, 531
Haryana power sector 147, 148
Hastings Port 287, 304
Hazira–Bijaipur–Jagdishpur pipeline 420
HEC (Hydroelectric Corporation) 243, 244
High speed diesel (*see* HSD)
High tele-density countries 349, 350
High-berthing detention 283
High-cost power 133
High-pressure transportation pipelines 425
High-priced services 373
High-voltage transmission 195
High-yield bonds 391
Hindustan Petroleum Corporation Limited (*see* HPCL)
Holden Dock 301
Household
  electrification 231
  savings 314
  tariff: electricity 196
HPCL (Hindustan Petroleum Corporation Limited) 445, 464, 543
HSBC Investment Banking 543
HSD (high speed diesel) 457, 459, 461, 463, 479, 491
Hughes Ispat Ltd 329
Human Rights Commission 28
Hydro
  plants 73, 88
  power 132, 232
Hydrocarbons 436, 484, 488, 492
  sector 43, 496
Hydroelectric projects 114
Hydropower 69
Hydro–thermal mix 228

IAP (Internet access provider) 400, 401
IBP (Indo-Burmah Petroleum) 411, 464
IC (Industry Commission), Australia 266, 275, 276, 505
IDFC (Infrastructure Development Finance Company Limited) 6
IEC (Israel Electric Corporation Limited) 188, 190–194, 196
Implementation
  strategies 484, 501
Import
  cost 448, 495
  duty 529
  licensing 27
  parity 413, 418, 457
  gas 424
Incentive
  mechanisms 509, 512, 513
  packages 231
  regulation 187, 508
  tariffs 210
Incremental
  cost 202
  efficiency requirements 214
  revenue 212
Incumbent
  access providers 404
  networks 349
  operator 387
Independent power producers (*see* IPPs)
Independent
  and empowered regulator 340
  approvals body 330
  audit standards 360
  authority 316, 437
  generators 139
  pricing 242
  private generator 150
  public utilities 190
  regulation 3, 4, 6, 7, 31, 42, 43, 54, 114, 198, 199, 201, 420, 442
  regulators 114, 198, 213, 242, 287, 331, 338, 340
  regulatory agencies 29
  regulatory authority 187, 309, 323
  regulatory body 27, 308
  regulatory commissions 80, 99, 101, 104, 128
  regulatory institution 534

  regulatory mechanisms 28
  system operators (*see* ISOs)
  transmission companies 119
India: cellular tariff 376
India: Constitution 18, 69, 99
Indian Airlines 533
Indian Electricity (Supply) Act, 1948 94, 122
Indian Electricity Act, 1910 39, 70, 93–95, 102, 122, 207, 209
Indian Electricity Act, 1903 200
Indian Electricity Rules 1956 70, 94
Indian Oil Corporation Ltd (*see* IOCL)
Indian Petroleum Act 415
Indian Ports Act, 1908 263, 255, 260, 282, 284, 286, 523
Indian Ports Association 523, 543
Indian Telecom Act 332
Indian Telegraph Act, 1885 39, 323, 330, 333, 339, 340, 526
Indian Wireless Act, 1933 323, 526
Indian Wireless Telegraphic Act, 1885 39
Indian
  coastline 523
  economy 42, 312, 413, 483
  electrical system 107
  electricity industry 82
  electricity sector 126
  financial institutions 313
  gas industry 443
  industry 499
  judiciary 18
  liberalization policy 359
  oil companies 499
  oil industry 412
  oil sector 484, 485, 498
  Parliament 19, 497
  petrochemical industry 441
  port 277, 282, 310
  power sector 132, 137, 204
  scenario 96, 135
  telecom industry 330, 338, 356, 358, 383, 527
Indo-Burmah Petroleum (*see* IBP)
Industrial
  consumers 77, 115, 235
  development 225, 436, 471, 472
  distribution systems 235
  exim policy 482
  growth 77
  licensing 27
  policy 95
  tariff 211
Industry Commission (*see* IC)
Industry
  consolidation 387
  coordination meeting 432
  costs 240
  experts 484, 496
  federations 420
  investors 490
  restructuring 436
  structure 326
Inflationary pressures 457
Information
  asymmetry 404
  authenticity 378
  disclosure 185
  dissemination 46, 74, 87, 91
  products 541
  technology (*see* IT)
  free access 224
Information-gathering provisions 396
Infrastructure Development Finance Company Ltd 3, 543
Infrastructure Report: India 277
Infrastructure 28, 29, 63, 64, 69, 75, 84, 88, 308, 326, 327 346, 352, 356, 377, 393, 403, 441, 442, 448, 459, 501, 528
  bottlenecks 417
  development 3, 6, 8, 148, 234, 277, 278, 321, 327, 348, 456
  development capital 358
  development plan 280
  duplication 403
  entities 63
  facilities 259, 429
  input 368
  investments 471
  operators 351
  pricing process 66
  projects 6, 8, 58, 65, 314
  projects: funding 314
  regulation 335
  sector 87, 313, 521
  sectors: India 54
  service 7, 31, 39, 40, 64
  sharing 351
Inland refineries 450
Installed
  capacity 69, 228
  generation capacity 189
  national capacity 203
Institute of Chartered Accountants 531
Institute of Cost and Works Accountants 531
Insurance Act, 1938 48
Insurance Regulatory Authority (*see* IRA)
Insurance Regulatory Authority Bill, 1998 31, 43, 45, 48
Insurance 48, 227, 314
  corporations 538
  industry 48
  sector 43, 538
  sector: liberalization 539
Integrated
  infrastructure development 277, 279, 313
  labour forces 267, 269
  monopoly 137, 147
  port development 277, 284
  port infrastructure development project 315
  regulatory authority 440, 528
  resource planning (*see* IRP)
  Services Digital Network (*see* ISDN)

  infrastructure imperatives 312
Inter State Commission 266
Interclass cross-subsidies 153
Interconnection
  agreements 363, 370
  charges 349, 370, 372, 373
  pricing 347, 348
  regulatory framework 347
  services 348
Interest
  rate structure 313
Inter-firm comparison 226
Inter-fuel substitution 460
Intergovernmental cooperation 36
Inter-industry consultations 420
Inter-modal competition 420
Internal rate-of-return approach 512
International
  benchmarking 66
  competitiveness 265, 412
  container tariff 307
  conventions 263
  debt 482
  demands 506
  developments 46
  energy regulatory issues 114
  gateways 387
  investors 355
  long-distance traffic 323
  market opportunities 374
  operators 527
  price fluctuations 457
  price movements 497
  prices: fuel oil 425
  shipping lines 314
  traffic 400
Internet 326
  access 400
  dialup charging 401
  industry 329, 401
  policy 381
  service 364
  service providers (*see* ISPs)
  telephony 381
Inter-port competition 266, 280
Inter-regional transmission capacity 210
Inter-sectoral national campaign 537
Interstate Commerce Act 115
Interstate long-distance
  capacity 358
  facilities 358
Interstate pipelines 425
Inter-utility power transfer 200
Intrastate
  competition 266
  transactions 183
Inventory costs 460
Inverse performance rebates 307
Investment
  costs 184, 187
  opportunities 327
Investments 58, 77, 100, 238, 247, 351, 384, 397, 437, 461, 472, 482, 487, 512, 516, 517
  power 205
Investor protection 227
Investor-owned electricity companies 185
IOCL (India Oil Corporation Ltd) 417, 444, 464, 481, 516
IPO (initial public offering) 389
IPPs (independent power producers) 59, 72, 75, 89, 96, 97, 130, 132, 138, 139, 144, 151, 188, 189, 196, 202, 203
IRA (Insurance Regulatory Authority) 29, 42, 44, 45, 49–53, 227, 538
IRP (integrated resource planning) 58, 234, 235
IRPPs (independent rural power producers) 231
ISDN (Integrated Services Digital Network) 326, 374, 399, 400
ISOs (independent system operators) 117, 119, 500
Ispat Group 445
ISPs (Internet service providers) 323, 381, 401
Israel Electric Corporation Limited (*see* IEC)
Israel Electricity Industry Law 188
Israel Electricity Law 1996 196
IT (information technology) 323, 326, 502, 526, 527

Jaigad port development project 279
Jawaharlal Nehru Port 256, 310, 312
Joint
  sector ports 312
  venture formations 283

Karnataka State Electricity Board 204
KEPCO (Korean Electric Power Company) 447, 448
Kerosene 416, 418, 434, 455, 456, 460, 479, 484, 491, 532
KOGAS (Korea Gas Corporation) 446–448
Korea Gas Corporation (*see* KOGAS)
Korean
  firms 448
  government 448
  shipping industry 447

Labour
  practices 267
  reforms 269, 312, 525
Landbridging cargoes 266
Landfall point 450
Landlord ports 281
Lascelles wharf 304
Leasing policies 265, 267
Legal
  framework 415, 436

  instruments 503
Legislative Council 93
Legislative
  drafting problems 363
  initiatives 198
  powers 93
  requirements 200
  sanction 79
  scrutiny 42
Liberalization 42, 69, 90, 121, 203, 330, 331, 356, 468, 469, 501–503, 514, 524, 535
  process 436, 524
  insurance sector 539
  ports 264
  telecom sector 321, 361
Liberalized
  environment 99, 104, 114, 121, 183, 204, 255, 374, 464, 468, 475, 501, 503, 528
  telecom regimes 357
Licence
  agreement 325, 327
  application 422
  conditions 335, 356
  fees 322, 327, 331, 341, 355, 356, 358, 360, 383, 386, 389, 426
Licensee 85, 95, 111, 114, 325, 338, 339, 355, 370
Licensing 43, 266, 327, 335, 336, 338, 352, 356, 357, 358, 481
  cell 385
  function 356
  mechanism 327
  model 386
  options 327
  power 108, 356
  procedure 417
  regime 352, 385
Licensor 325, 330–332, 338, 339, 526
Life Insurance Corporation Act, 1956 48
Line handling 265
Liner Shipping Services (*see* LSS)
Liquefied natural gas (*see* LNG)
Liquefied petroleum gas (*see* LPG)
Liquid
  bulk 303
  fuels 194
LNG
(liquefied natural gas) 424, 425, 444, 445, 447, 448, 453, 460, 471, 495, 498
  carriers 447
  chain 445
  import 447, 449
  purchases 447
  terminals 446
Load
  control system 188
  dispatch 132, 213
  factor 154
  growth potential 229
  management actions 83
Local
  competition 363
  electricity distribution 235
  electricity generation 235
  grids 236
  implementation issues 376
  network 368
  port trust 312
  supplier 309
  systems 368
Long-distance
  call charges 370
  competition 363
  facilities 358
  licence 358
  monopoly 358
  network 356
  service 368
  transmission 372
Long-run
  marginal cost (*see* LRMC)
  marginal cost model 529
  incremental cost (*see* LRIC)
Low
  sulphur heavy stock (*see* LSHS) 437
  tele-density countries 349, 350
Low-cost
  energy supplier 506
  funds 314
  generator 144
  power 133
Low-income rate subsidies 185
Low-voltage distribution 195
LPG (liquefied petroleum gas) 279, 413, 418, 426, 437, 456–459, 462–464, 468, 479, 491, 532
LRIC (long-run incremental cost) 369
LRMC (long-run marginal cost) 85
LSHS (low sulphur heavy stock) 418, 437
LSS (Liner Shipping Services) 272
LT (low tension) consumers 230
LTIE (long-term interest of end-users) 403, 404
Lubes marketing 458, 459
Lubricants 279, 464, 532

Macroeconomic reforms 482
Madras Refineries Ltd (*see* MRL)
Mahanagar Telephone Nigam Limited (*see* MTNL)
Major port infrastructure 312
Major ports 45, 282–285, 311–313, 317
Major Port Trusts Act (*see* MPTA)
Management information system (*see* MIS)
Management
  contract 89
  costing systems 530
  incentives 137
  philosophy 378
  policy 511
  research 486
  port 278

Mangalore Refineries and Petrochemicals Ltd (*see* MRPL)
Manmade pipeline: Mumbai 453
MAR (maximum average revenue) 289
Marginal cost (*see* MC)
  concept 201
  pricing 316
Marginal costs
  supply 152, 212
  supply and transportation 152
  transmission 140
  transportation 152
Marginal
  production costing 195
  system costs 197
Marine Board, Victoria 289
Maritime Service Board (*see* MSB)
Maritime Union of Australia (*see* MUA)
Maritime
  boards 282, 285
  commerce 291
  states 284
  trade 523
Market 473, 483, 527
  concerns 402
  convergence 347
  deregulation 451
  development 78, 258, 521
  effects 362
  entry 348
  environment 328, 506
  evolution 81
  failure 346
  forces 348, 416, 441, 484, 501
  imperfections 7
  information 403
  issues 335, 453
  liberalization 323, 371
  mechanisms 39, 346
  models 133
  orientation 144
  power 142, 357, 358, 360, 401, 405, 470, 506, 508
  pressures 305
  prices 146, 494
  regulation 23, 335, 362
  regulators 335
  shares 353, 388, 401, 454, 458
  structure 77, 121, 122, 132–134,137, 147, 151, 156, 252, 258, 327, 334, 335, 340, 355, 384, 455, 456, 464, 513, 516, 521, 527, 528
  uncertainty 485
  viability 375
Market-based regulation 362
Marketing 352, 411, 416, 464, 481, 493, 516
  challenges 460
  companies 450, 456, 458
  costs 458
  infrastructure 380, 462
  network 467
  operations 442
  projects 466
  sector 491
  set-up 419
  lubes 437
  oil and gas 414
  products 417
Market-operation licences 243
Market-oriented
  environment 150
  liberalized framework 208
  pricing 325
Massachusetts DTE (Department of Telecommunications and Energy) 183, 362, 363
Massachusetts Electric Restructuring Act 184
Massachusetts Institute of Technology (*see* MIT)
Massachusetts Utility Commission 183
Massachusetts Electric 363
Maximum average revenue (*see* MAR)
Maximum weighted average revenue (*see* MWAR)
MC (marginal cost) 84, 85, 87, 112, 139, 140, 145, 192, 209, 219, 261
  pricing 262
Mean marginal cost 305
Medium-voltage distribution 195
Melbourne Port Services (*see* MPS)
Melbourne Ports Corporation (*see* MPC)
Merchant Shipping Act, 1958 39, 255
Michigan State University 34
Mid Tapti 443
Mining leases 442
Ministry of
  Coal 488
  Communications 339, 356, 380, 527
  Environment and Forests (*see* MoEF)
  Environment: Korea 448
  Finance 63, 314, 431, 487
  Industry 488
  Internal Trade and Industry (*see* MITI)
  National Infrastructure 189
  Non-conventional Energy Sources (*see* MNES)
  Petroleum and Natural Gas (*see* MoPNG)
  Power (*see* MoP)
  Railways (*see* MoR)
  Surface Transport (*see* MoST)
  Trade, Industry and Energy 448
Minor ports 282, 312, 523
MIS (management information system) 73, 85, 86, 433, 434, 461
MIT (Massachusetts Institute of Technology) 503, 504
MITI (Ministry of Internal Trade and Industry) 446
MNES (Ministry of Non-conventional Energy Sources) 231, 236

Mobile phone networks 407
Model
  framework for
    interconnection 325
  terms and conditions 185
  regulation 330
  restructuring 125
Modern infrastructure 381
MODVAT 466
MoEF (Ministry of Environment and Forests) 380, 487, 488, 490
Monopolies and Restrictive Trade Practices Act (*see* MRTP Act)
Monopoly 30, 120, 264, 306, 308–310, 316, 323, 325, 331, 341, 352, 362–364, 368, 369
  company 137
  conditions 311
  connection 363
  controlled facility 349
  environment 368
  port services 287
  ports 306
  power 316
  price makers 365
  regulation 23, 362
  rents 249, 358
  service provider 308
  services 152, 366
  structure 152
  supplier 356
  telecom 359
Mooring services 266
MoP (Ministry of Power) 69, 75, 76, 488
MoPNG (Ministry of Petroleum and Natural Gas) 415, 416, 431–433, 442, 443, 445, 448, 449, 456, 483–485, 487, 488, 492, 493, 496, 498, 500
MoR (Ministry of Railways) 435, 487, 490
MoST (Ministry of Surface Transport) 277, 314, 380, 435, 487, 488, 490
Motor spirit (*see* MS)
MPC (Melbourne Port Corporation) 269, 272, 288, 291, 300
MPS (Melbourne Port Services) 272
MPTA (Major Ports Trust Act, 1963) 39, 255, 259, 282, 284, 286, 312, 523
MRL (Madras Refineries Ltd) 464
MRPL (Mangalore Refineries and Petrochemicals Ltd) 464
MRTP (Monopolies and Restrictive Trade Practices) Act 27
MS (motor spirit) 457, 461, 463, 479, 491
MSB (Maritime Service Board) 269, 271
MTNL (Mahanagar Telephone Nigam Limited) 322, 337, 351, 357, 360, 361, 384
MUA (Maritime Union of Australia) 272
Multinational companies 383, 443
Multi-operator
  environment 346, 347
  markets 351
Multiple service providers 372, 381
Multi-utility commissions 530
Mumbai 27, 76, 425, 426, 309, 322, 360
  Port 310
  Manmade pipeline 453
Municipal
  electricity 184
  load aggregation plans 186
MWAR (maximum weighted average revenue) 292–295

NARUC (National Association of Regulatory Utility Commissioners) 33, 34
National & Regional Telecom Users' Councils: UK 332
National Association of Regulatory Utility Commissioners (*see* NARUC)
National Competition Council 507
National Competition Policy 270, 505
National Economic Research Associates (*see* NERA)
National Electricity Market Management Company (*see* NEMMCO)
National Energy Act, 1978 115, 116
National Regulatory Research Institute (*see* NRRI)
National Telecom Policy (*see* NTP)
National Thermal Power Corporation (*see* NTPC)
National Third Party Access Code 507
National
  Gas Code 508, 509
  Grid Company 10, 363
  Grid Management
    Council 241
  Grid: UK 204
  highway 279
  infrastructure 193
  long-distance services 358
  oil companies 413, 414, 492
  port development plan 280
  Power Grid 76
  power policies 94
  power resources 94
  regulator: transmission 249
Nationalized road transport 308
Natural Gas Act, 1938 114
Natural Gas Policy Act, 1978 114
Natural gas 114, 115, 414, 442–444, 448, 460, 468, 469, 471, 472, 495, 507
  industry 474, 505
  pipelines 505, 507
  pricing 491

  production 444
  products 489
  regulations 445
  sector 413, 420, 489, 496
  sector: regulation 469
Natural
  monopoly 365, 420, 436, 455, 502
  resources advantages 393
  Wealth of Nations 112
Navaratna 462, 463, 498, 516
Navigation service charges 276
NEC (National Electricity Code) 245–248
NECA (National Electricity Code Administrator) 245
NEEPCO 75
NELP (New Exploration Licensing Policy) 414, 415, 443, 474, 497, 498
NEM (national electricity market) 241, 244–248
NEMMCO (National Electricity Market Management Company) 245, 246
NERA (National Economic Research Associates) 107, 137, 147, 150, 156, 420, 471
Netco 351–353, 527
Network 321, 350, 351, 353, 357
  capacity 353
  costs 388
  coverage 328, 353
  element layer 392
  elements 347–349
  infrastructure 346, 348
  interface devices 349
  performance 353
New England ISO 119
New Exploration Licensing Policy (*see* NELP)
New Mexico State University 34
New South Wales 244–246, 248, 507
  electricity market 242
New Telecom Policy 1999 326, 338, 341, 342, 356, 359, 374, 381, 382, 527
New York ISO 119
NFFO (non-fossil fuel obligation) 236
NGMC (National Grid Management Council) 241
NHPC (National Hydro Power Corporation) 69, 75, 96
Night-time economy rates 15
Ninth Five-Year Plan 283, 444, 483, 523
Ninth Plan Working Group 258, 283
Non-conventional renewable energy sources 232
Non-financial parameters 386
Non-fossil fuel obligation (*see* NFFO)
Non-traditional geographic markets 514
Non-utility generators 116
Nord pool 131
North American Electric Reliability Council 118
NRL (Numaligarh Refineries Ltd) 465
NRRI (National Regulatory Research Institute) 33, 34, 503
NTP (National Telecom Policy) 1994 42, 331, 332, 337, 341, 342, 368, 380, 534
NTPC (National Thermal Power Corporation) 69, 75, 96, 125, 522
Nuclear
  energy 145
  power plants 76
  regulatory commission 239
  stations 11, 12
Numaligarh Refineries Ltd 465

O&M (operation and maintenance) 193, 222, 476, 478
OCC (Oil Coordination Committee) 411, 412, 413, 415, 417, 418, 427, 431, 432, 434, 441, 481, 484–486, 490, 516
Oceania: cellular tariff 376
OERC (Orissa Electricity Regulatory Commission) 73, 104, 105, 108–112, 152–156, 208, 210, 226, 522, 531, 543
Off-peak period 83
Offshore
  areas 414
  installations 455
OGL (open general licence) 445
Ohio State University 33, 34, 503
OIL (Oil India Ltd) 411, 414, 425, 441, 443, 464
Oil and gas 411, 415, 503
  distribution 469
  reserves 492
  sector 475, 501
Oil and Natural Gas Corporation Limited (*see* ONGC)
Oil Coordination Committee (*see* OCC)
Oil India Ltd (*see* OIL)
Oil 279, 414, 464, 481, 500, 522, 532
  bonds 480
  companies 441, 454, 455, 461, 467, 480, 488, 498, 499, 516, 517
  consumption 412, 483
  enterprise 487
  field operations 492
  GDP elasticity 483
  markets 483, 488
  operations 488, 493
  organizations 493
  prices 115, 494, 497
  products 485
  public sector undertakings 462, 463

  sector 411, 440, 460, 479, 481, 482, 485, 489
  sector regulation 412
  security 411, 461
  Selection Board 454
Oil industry 411, 417, 431, 434, 461, 464–466, 481, 488, 489, 492–494, 500
  associations 435
  Development Board 427
  practices 442
  Safety Directorate 419
  R Group 483
  restructuring 496
Oil marketing
  companies 419
  reforms 450
Oil pool
  account 480, 516
  account deficit 411
OILCOMNET 433
Oilfields (Regulation and Development) Act, 1948 415, 427
OISD 435
Omega Energy 243
ONGC (Oil and Natural Gas Corporation Limited) 411, 414, 425, 441, 443, 444, 464, 468, 475, 476
Onramp Xpress 399, 400
OOCL (Overseas Orient Container Line) 271
Open
  access 130, 131, 424
  competition 408
  competitive market 325
  general licence (*see* OGL)
Open-access
  model 128, 130, 133, 134, 136
  transmission grid 138
  transmission system 131
Operating
  cost 140
  expense 476
  expense differential 476
  partner 389, 390
  refineries 457
Operational
  efficiency 311
  feasibility 147
  safety 279
  support systems 349
  government policy 416
OPGC (Orissa Power Generation Corporation) 73
Opportunity cost: capital 207
Optimum reservoir management 442
Orissa Electricity Reform Act, 1995 72, 105, 109, 111, 154, 201
Orissa Electricity Regulatory Commission (*see* OERC)
Orissa Hydro Power Corporation 73
Orissa Power Generation Corporation (*see* OPGC)
Orissa
  model 74, 75, 96, 148
  reform process 252
  reform project 147
OSEB (Orissa State Electricity Board) 72, 73, 207
Other Maritime Zones Act, 1976 427
Overseas
  break bulk 303
  container trade 303

Paradip Port 311
Parliamentary control 330
Participative management style 486
Partnership approach 486
PBR (performance-based regulation) 85, 86, 150, 153, 197
PCRA (Petroleum Conservation Research Association) 427, 488, 489
PDS (public distribution system) 457
Performance
  indicators 98, 267
  orientation 200
  standards 89, 110
Performance-based
  approach 208
  mechanism 111
  pricing 305
  rate plants 186
  rates 362
  regulation (*see* PBR)
  tariff 155
Performance-linked incentives 210
Petrochemical
  companies 440
  plants 441
  products 440
  sector 440
Petrofed 461, 484, 488, 489, 493, 494, 517, 528
Petroleum Act, 1934 427
Petroleum and Natural Gas Rules 415, 427, 442, 492
Petroleum Conservation Research Association (*see* PCRA)
Petroleum Pipelines Act, 1962 427
Petroleum regulatory bill 497
Petroleum 464, 481, 496, 532
  business 494
  exploration 492
  exploration licences 492
  Federation 484
  industry 411, 440, 442, 460, 481, 489, 493
  products 287, 299, 303, 416, 418, 431, 432, 434, 456, 460 464–466, 479, 480, 483, 484, 489, 494, 496–498, 516, 532
  products: import 303
  reservoirs 492
  resources: conservation 492
  sector 436, 437, 481, 483, 484, 487, 489, 490, 496
  profits 414
Petronet India Ltd 467
Petronet LNG Limited 444, 445

- PFC (Power Finance Corporation) 69, 76, 226
- PGA (Port of Geelong Authority) 272, 287
- PGCIL 69, 71, 76
- Phone card services 402
- PhoneAway 401, 402
- Phosphatic rock 302, 303
- Pilgrim Nuclear Power Station 186
- Pilotage 258, 259, 265, 266, 269, 276
  - services 266
- Pipavav Port 285, 310, 445
- Pipeline
  - assets 507
  - facilities 513
  - market 470
  - safety 362, 427
  - sector 500
- Pipelines 465–468, 470, 471, 473, 475, 477, 479, 482, 498, 500, 505, 507, 510–512, 514, 516, 517
- PLA (Port Laws [Amendment]) Act, 1997) 43, 44, 48, 258
- Planning Commission 531
- PLF (plant load factor) 70, 77, 125, 203
- PMA (Port of Melbourne Authority) 269, 272, 287, 296
- Policy
  - actions 328
  - decisions 367
  - development 502
  - development process 502
  - directives 80
  - formulation 494
  - formulation and implementation 324
  - framework 127, 324, 326
  - goals 366, 397
  - guidelines 435
  - issues 437, 536
  - objectives 334
  - options 502–504
  - reforms 69, 241, 247, 501
- Political
  - convenience 250
  - environment 521, 522
  - issues 336
  - motivation 321
  - pressures 81
- Pollution 448
  - prevention and control 263
- Pollution control 461, 470
  - boards 488
  - equipment 531
  - measures 492
- Pool
  - accounts 482, 496
  - generated electricity 236
- Port of Geelong Authority (*see* PGA)
- Port of Melbourne Authority (*see* PMA)
- Port of Portland Authority 287, 296
- Port of Rotterdam 286
- Port of Westernport 269
- Port Phillip and Corio Bays 288
- Port Phillip Sea Pilots 289
- Port Services Act, 1995 289
- Portland Aluminium Smelter 288
- Portland Port 288, 289, 293, 296, 298
- Port 283, 294, 307, 311, 315
  - activities 43
  - authorities 259, 260, 265–267, 269, 273, 275, 280, 284, 286, 287, 292, 314, 316, 525
  - authority charges 276
  - authority employment 269
  - authority reforms 271
  - authority regulation 266
  - competition 280, 307
  - development 265, 278, 311, 314
  - development authority 278
  - development projects 313
  - emergency services 265
  - facilities 42, 277–279, 284, 285, 312
  - industry 524
  - infrastructure development 313, 314, 459
  - Leasing Policies 275
  - management 260, 280, 284, 307, 523
  - navigational facilities 280
  - operating companies 524
  - pricing 305
  - privatization 286
  - projects 313, 314
  - promotion fund 291
  - promotion levy 291
  - regulation 316
  - sector 39, 42, 43, 278, 308
  - service providers 265
  - services 280, 289, 290
  - terminals 469
  - trust organization 255
  - trusts 48, 260, 524
- Ports 28, 45, 258, 259, 262, 264, 269, 277, 281, 282, 285, 286, 289, 293, 305, 311, 316, 317, 442, 482, 487, 523, 524
- Ports of Newcastle 271
- Ports of Tasmania 266
- Ports sectors 63, 258
- Port-trust-tariffs 535
- Post-APM scenario 484
- Post-tax return 203
- Power Grid Corporation of India Limited 135, 211, 527
- Power Trading Corporation (*see* PTC)
- Power 42, 59, 63, 131, 151, 243, 309, 448, 468, 472, 521, 537
  - connection 64
  - consumption 131
  - cost 92
  - exchanges 97
  - factor 83, 154
  - generating companies 97
  - generation 121, 468
  - industry 59, 122, 123, 126
  - investments 205
  - market 116, 118, 128, 131, 521

  market model 128, 133
  marketing 55, 57
  outages quality 193
  planning 143, 149
  plant construction 187
  plants 82, 115
  pool 128
  pool model 131
  procurement 132
  producers 116
  project capacities 126
  projects 445
  purchaser 149
  reforms 250
  regulatory commission 74
  sales 120
  sector 3, 6, 7, 20, 39, 42, 43, 45, 63, 71, 75, 76, 83, 104, 126–128, 133, 135, 146–148, 150, 153, 228, 232, 308, 341, 483, 500, 521
  stations 125
  tariffs 83
  trading 136
  trading model 135
  utility companies 447
  purchaser 149
  sources 154
Power purchase 130, 133
  agreements (*see* PPAs)
  contracts 186
  costs account 96
  model 135
  process 100, 101, 251, 522
Power sector
  reforms 72, 101, 108
  restructuring 104
Power supply 83, 128, 152, 309
  regulating 309
Power system
  planning 73
  studies 122
PPAs (power purchase agreements) 85, 98, 132, 134, 135, 139, 149, 151, 152
Prepayment meters 15, 16
Pre-qualification: technical, financial 336
Press Council of India 532
Pre-tax investment 414
Prevention and control: pollution 263
Price
  cap regulation 55
  caps 56, 57, 111, 290, 292, 362, 366
  competition 393
  control formula 292
  controls 15–17, 286, 292, 427, 481, 482
  decontrol 483
  index 194
  monitoring 276
  movements 292
  regulation 85, 269
  regulator 60
  setting 479
  signals 348
  stability 77, 428
  structures 365, 366
  volatility 442
Prices Surveillance Act (*see* PSA)
Pricing 58, 59, 66, 87, 98, 110, 117, 130, 143, 152, 267, 473, 491
  and tariff policy 151
  behaviour 404
  decisions 60
  elements 432
  guidelines 267
  inefficiencies 240
  issues 153 471
  mechanism 112, 122, 140, 229
  method 82
  orders 289, 290, 295
  policies 130, 151
  process 285
  regulation 289
  structure 85, 132, 508
  market-oriented 325
  reactive power 200
  telecom services 369
  value-based 305
Primary service provider 508
Private
  capital 77, 104, 200, 483
  cellular and basic operators 358
  electricity producers 190
  entrepreneurs 285, 358, 484
  generation projects 206
  investment 28, 42, 70, 256, 322
  investor interest 498
  investors 106, 469, 496
  licensees 357
  management 125
  monopolies 470
  operators 260, 277, 311, 313, 341, 534
  participation 70, 98, 321, 323
  ports 524
  power policy 122, 123, 229
  power producers 6
  terminal operators 311
  utilities 76, 201
  investors 252
Private sector 40, 69, 81, 89, 90, 95, 104–106, 121, 149, 256, 313, 337, 412, 418, 471, 493, 497, 503
  enterprises 65
  funding 313
  investment 64
  involvement 284
  licensees 360
  participation 88, 89, 209, 231, 285
  ports 45, 312
  refineries 417
  retailers 242
Privatization 16, 59, 87, 88, 90, 106, 123, 149, 152, 252, 267, 276, 283, 284, 285, 287, 295, 308, 330, 448, 523, 524, 537
  model 380
  plans 244
  process 251, 540
  programme 213, 482
Privatized transmission company 243
Processing configuration 431
Procurement process 100, 101

Product
  exchange agreements 456
  imports 418
  movement 456
  pipelines 419
  prices 517, 482
  quality 454
  specifications 434, 460
Production 429, 481, 497, 516
  cost 195
  quotas 440
  ratio: electricity 188
  electricity 137
Production-sharing contracts (*see* PSC)
Profit regulation 366
Profitable markets 367
Progressive decanalization 418
Project
  costs 383, 391
  implementation 312
  viability 388
Protected
  environment 440
  monopolies 202
PSA (Prices Surveillance Act) 275, 276
PSCs (production-sharing contracts) 222, 414, 442, 443
PSTN (public switched telephone network) 329, 407
PSU (public sector undertaking) 89, 453, 454, 457, 458, 462, 466, 476, 483, 484, 487
  corporatization 276, 498, 524
PTC (Power Trading Corporation) 97, 133, 206
PUA (Public Utilities Authority - Electricity) 187, 189, 190, 191, 193–195
Public
  charges 360
  distribution system (*see* PDS)
  distribution utilities 206, 210
  Investment Board 454
  policy 104, 113, 143
  policy experience 59
  policy goals 365, 366
  policy objective 325
  policy reform 506
  provident fund 314
  services sector 224
  subsidies 502
  switched telephone network (*see* PSTN)
  telecom services 339
  utilities 116, 119, 145, 201, 202, 213, 224, 308, 323, 337, 365, 535
Public sector
  enterprises 65, 70, 359
  entities 64
  oil companies 419, 456, 463, 498
  refineries 417, 418
  suppliers 360
  undertakings (*see* PSUs)
Public Utilities Authority (*see* PUA)
Public Utilities Commission 224
Public Utilities Regulatory Policy Act (*see* PURPA)
Public Utility Holding Company Act (*see* PUHCA)
Public Utility Regulatory Policies Act 1978 115, 116
PUHCA (Public Utility Holding Company Act) 115, 116
PURPA (Public Utilities Regulatory Policy Act) 36, 59, 114–116
Public utility
  licensor 351
  service 89, 187
  system 150
Purchasing agency 78, 138, 140, 141, 144, 149, 150

Qualcomm 382
Quality
  assessment surveys 378
  electricity 190, 193, 197
  personnel 537
  power outages 193
  products 454
  products and services 467
  supply 197, 198
Quality-dependent tariff 197
Quasi-infrastructure sectors 65
Quasi-judicial
  authority 488
  status 32, 44, 461
Quasi-monopoly positions 30
Queensland Competition Authority 243
Queuing policy 511

R Group 412, 416, 483, 484, 491, 496, 499
R&D (research and development) 509, 517
  gas 446
Radio
  communication 339
  frequency spectrum 330–332
  paging 321, 329
Railway freight 450
Railways 63, 93, 285, 358, 453, 527
Rajadhyaksha Committee 227
Rajasthan 75, 109, 329
RasGas 445
Rate
  base 110, 222, 477, 478
  design 222, 478
  of return (*see* RoR)
  stability 365
  structure 98
  consumption 189
Rate-setting process 191
Rationalization
  subsidies 199
  tariffs 105, 201, 206
Ravva gas fields 443
RBI (Reserve Bank of India) 27, 28, 97, 98, 203–205, 210
  rate 202, 203, 205, 210
Real-time
  monitoring 135

  - pricing 145
- REC (Rural Electrification Corporation) 69, 76
- Recommendatory
  - functions 324, 325
  - powers 384
- Recoverable reserves 441
- Reduction: corruption 147
- Reference tariff 512, 513
  - policy 512
  - principles 511
- Refiner bases 451
- Refineries 412, 413, 417, 418, 431–433, 451, 455, 479, 480, 491, 496, 499, 500, 517
- Refinery
  - configurations 432
  - operations 433
  - pier 304
  - products 441
- Refining 411, 417, 429, 434, 450, 464, 481, 482, 493, 516
  - capacity 431
  - industry 433, 498
  - sector 480
- Reform Act 75
- Reform 86, 87, 99, 102, 103, 105, 112, 128, 130, 132, 136, 137, 150, 151, 201
  - agenda 111
  - initiatives 496
  - investment 213
  - process 69, 78, 90, 252, 500
  - programme 72, 74, 79, 80, 87, 88, 91, 92, 98, 104, 106, 132, 133, 135, 213
  - project 150
  - distribution 201
  - generation 201
  - Indian power sector 137, 147
  - transmission 201
- Reforms
  - infrastructure sector 321
  - regulations 315
  - sequencing 537
  - telecom sector 324
- Regional
  - cargo port 287
  - electricity companies 251
  - electricity boards 135, 243
  - grid management 118
  - load despatch centres (*see* RLDCs)
  - ports 273
  - reliability councils 118
  - trading pools 210
- Regional transmission organizations (*see* RTOs)
- Regulated
  - access regime 403
  - entities 7
  - firm 509
  - monopoly 145
  - policies 482
  - prices 290, 295, 508
  - rates 219
  - regime 482
  - services 290, 292–294, 298, 300, 304
  - tariff structure 357
  - tariffs 251, 359
  - utilities 80, 90, 91, 98
- Regulation
  - policy 9
  - systems 187
  - Tribunal 242
  - economic principles 192
  - electricity 200
  - energy 114
  - energy industries 114
  - generation 151
  - generic principles 537
  - India 238
  - levels 151
  - natural gas sector 469
  - natural monopolies 187
  - tariffs 151, 201, 231
  - transmission 248
  - UK 424
  - US 424
- Regulations
  - safety 492
- Regulator
  - electricity 41
  - electricity rates 190
  - empowered 340
  - independent 340
- Regulatory Commissions Bill 72, 74
- Regulatory
  - accounting 531
  - action 183
  - affairs 91
  - agencies 82, 86, 309, 311, 485, 487
  - approaches 334
  - arrangement 317, 535
  - aspects 312, 337
  - asset 155
  - assets base 59
  - authorities 18, 20, 43, 45, 46, 63–65, 70, 81, 224–227, 231, 255, 308, 309, 311, 340, 419, 438, 439, 449, 452, 461, 470, 474, 476, 485, 486, 488–490, 492–494, 501, 516, 524, 525, 528, 529
  - authority: gas 495
  - barriers 266
  - bodies 14, 28–32, 43, 47, 54, 61, 71, 72, 88, 226, 227, 239, 334, 387, 413, 416, 421, 434, 435, 438, 442, 467, 476, 484–488, 490, 494, 540
  - clarity 204, 206
  - commission 2, 9, 31, 32, 35, 37, 73, 74, 81, 85–87, 90, 91, 96, 98, 99, 101, 108, 110, 112, 113, 119, 150, 151, 228, 233, 235–237, 239, 521, 522, 540
  - continuity 206
  - control 10, 97, 102, 130
  - cooperation 531
  - databases 507
  - discretion 202
  - economics 32, 91, 531
  - efficiency 128
  - environment 91, 115, 334, 416
  - equilibrium 107
  - exhortation 212
  - experiences 531
  - expertise 387
  - framework 6, 7, 38, 96, 104–106, 108, 110, 113, 126, 143, 146, 256,

287–289, 323, 334, 336, 338, 341, 342, 346, 347, 373, 431, 436, 443, 445, 446, 448, 449, 468, 476, 484, 496, 516, 521, 528
freedom 501
functions 24, 127, 180, 429
goals 234, 237
guidance 239
hurdles 313
imperative 383
initiatives 198, 204, 206, 214
institutions 6, 122, 127
interest 202
intervention 206, 473, 485
judgement 348
law 45
measures 61, 449
mechanism 18, 20, 225, 228, 308, 402, 508, 535, 536
objective 209
option 373
organization 5, 476
overdrive 206
policy 35, 55
powers 419
practice 202
presence 371
pressures 373
principles 206
problems 387
procedure 109
processes 46, 233, 234, 499
provisions 263
purposes 367
purview 346
reforms 57, 77, 78, 91, 99, 224, 228, 239, 262, 287, 312, 469, 481, 503, 517
regime 33, 91, 210, 325
research institute 38
response 507
review 56, 183
role 338, 524
sector 238
services 82
set up 97
structures 86, 88, 90, 150, 362, 486
Studies and Governance Division 46, 541
supervision 470
system 27, 126, 416, 419
theory 477
transformation 208
uniformity 206
Regulatory concerns 327
Reinsurance business 48
Reliability requirements 197
Reliance Industries Limited 445
Reliance Petroleum Limited 453, 454, 465
Reliance Telecom Pvt. Ltd 329
Renewable energy
  cogeneration 59
  sector 231
  sources 185, 231
  systems 231
  technologies 236
Reserve Bank of India (*see* RBI)
Reservoir management 492
Resources
  allocation 59
  conservation 427, 428, 528
  extraction 497
  limitations 234
  mobilization 312
  economic use 112
Restricted labour practices 259
Restrictive trade practices 359, 405
Restructuring
  group 483
  model 107
  electricity industry 43, 183, 185
  Oil Industry 496
  SEB 99
  tariffs 201
Retail
  customers 120, 140
  market 242
  marketing network 456
  outlets 454, 459
  price index-x (*see* RPI-x)
  supply 73, 100, 152, 153, 213
  supply decentralizing 153
  supply tariffs 73
  tariff rationalization 211
  tariffs 82, 131, 198, 201, 400
Retention pricing systems 65, 412, 529
Return on
  equity 192, 296
  investment 412
Revenue
  concerns 388
  generation 325
  requirement 365
  sharing 325, 377, 382, 384
  sources 358
  yield price control 287
Revenue-potential 386
Revenue-share 386, 388
Risk
  exposure 206
  factors 487
  optimization 205
RITES 317
RLDCs (regional load despatch centres) 97
Road
  transport 240
  transportation 459
RoR (rate of return) 57, 110, 111, 196, 199, 205, 206, 222, 229, 276, 420, 423, 260, 261
  component 477
  targets 269
RPI-x (retail price index-x) 58, 423
RTOs (regional transmission organizations) 117, 119
Rural
  areas 93, 113
  communities 235
  consumers 235
  distribution 205
  electrification 76, 145, 149, 230
  energy sector 228
  exchange lines 329
  households 64, 234
  penetration 329

renewable energy sector 228
subscribers 368

S

Safety
  and conservancy aspects 279
  and environment 429
  standards 495
  terminals 448
SAIDI (system average interruption duration index) 193, 197
SBM (State Maritime Board) 256
Sea transportation 265, 267
SEBI (Securities and Exchange Board of India) 27, 28, 225, 538
SEBs (state electricity boards) 9, 39, 63, 70, 72, 75–77, 79–81, 85–91, 94, 97, 99, 102, 104, 106, 121, 122, 125, 135, 136, 148, 149, 153, 203, 228, 230, 231, 233, 250, 251, 358, 527
  restructuring 99
Second Five-Year Plan 27
SERC (state electricity regulatory commission) 45, 71, 72, 75, 79, 91, 96, 100–102, 105, 126, 133, 156, 199, 250, 262, 489, 521, 522
Servco 351–353, 527
Service
  layer 392
  operators 347
  providers 48, 49, 329, 348, 351, 372, 510, 512, 513
  provision 267
Service quality 190, 325, 334, 454, 511
  index 362
  indicators 186
Shipping
  lines 280, 315
  technology 277
Short-term
  economy 97
  efficiency 139
  storage 289
Shoulder-load hours 195
Signalling systems 349
Singapore
  model 386
  refineries 454
Single-buyer model 128, 130, 133
SKO (superior kerosene oil) 437, 457, 459, 461
Small hydro projects 231
Small-scale industries 231
Smelter berth 299
  alumina 299
  aluminium fluoride 299
  fluid coke 299
  petroleum coke 299
Smelter liquids: liquid pitch 299
Social and economic
  challenges 501
  opportunities 326
Social and environmental
  costs 316
  obligations 316
Social
  and political environment 521, 522
  development 146
  policy 143, 149, 152
  policy obligations 145
Socio-political demands 351
Solar
  systems: renewable energy source 231
water heaters 234
South Wharf 300, 301
South-East Asian crisis 480
South-East Asian regions 440
SPC (Sydney Ports Corporation) 271
Special purpose vehicle (*see* SPV)
Spectrum
  allocation 333, 336
  management 326, 327, 335
Split rate base 366
SPV (special purpose vehicle) 389, 467
Stackyard/warehousing facilities 280
Staff regulatory authorities 66
Standard product pattern 432
Standing Advisory Committee on Frequency Allocation 380
State Bank of India 205
State Energy Commission: Western Australia 244
State Maritime Board (*see* SBM)
State Rural Electrification Development Corporation 75
State
  and central regulators 61
  commissions 33, 35, 38, 71, 100, 101, 106, 111, 119, 120
  electricity boards (*see* SEBs)
  electricity departments 76
  electricity regulatory commissions (*see* SERCs)
  electricity sector 99
  energy departments 122
  government agencies 312
  government budget 239
  governments 39, 71, 79, 80, 100–103, 106, 108, 109, 112, 115, 240, 442, 502, 523
  legislation 238, 429
  legislature 79, 99, 103
  level regulators 61
  participation 414
  policy 514
  port departments 285
  ports 259, 282, 284, 285, 523, 524
  power utilities 132
  regulation 330
  regulators 34, 119, 201, 206, 425, 507
  transmission unit 213
  transmission utility 211
  utility commissions 119, 185

- Statement of Regulatory Intent 249
- State-of-the-art
  - blending plants 458
  - refinery 499
  - technologies 230
- State-regulated electricity company 186
- Statutory
  - authority 183, 323
  - commissions 330
  - frameworks 224, 225
  - mechanism 225
  - regulatory authorities 224
- Stevedores 265, 313
- Storage and transportation 429
- Stranded
  - costs 184, 186
  - investment 183, 186
  - investment costs 184
  - Offer Service 184
- Strategic Planning Group 496
- Structural
  - model 251
  - reforms 213, 242
  - regulation 470
  - transformation 214
- Structured
  - growth 448
  - guarantee 391
- Suboptimal utilization 351
- Subsidies 48, 63, 65, 83, 84, 86, 87, 105, 113, 150, 224, 455, 529
- Subsidized
  - customers 212
  - power 84
- Subsidy
  - arrangements 349
  - mechanisms 145
- Super-critical boilers 235
- Superior kerosene oil (*see* SKO)
- Supply 85, 93, 94, 100, 107, 111, 112, 121, 131, 147, 251
  - and demand 448
  - and transportation 144
  - businesses: retail 151
  - businesses: wholesale 151
  - chain 434
  - companies 153
  - cost 131
  - Distribution Plan 432
  - gap 444
  - licences 95
  - risk 471
  - tariff 129
  - electricity 93, 105, 111, 138
  - energy 93
  - quality 197, 198
- Supreme Court 51, 333, 337, 339, 526
- Surat Electric Company 76
- Surface transport 382
- Sustainable
  - commercial revenue stream 249
  - development 232, 428, 522, 528, 531
- Swanston Dock 287
- Switching facilities 358
- Synthetic lubricants 458
- System average interruption duration index (*see* SAIDI)

- T&D (transmission and distribution) 70, 77, 98, 138, 141, 142, 210, 229, 242, 251, 444, 472
  - companies 472
  - gas 473
  - lines 138
  - losses 78, 83, 86, 155, 156, 210, 211, 227, 230
  - network 15, 445, 474
  - reforms 513
  - system 77, 79
  - electricity 189
- TAF (Telecommunication Access Forum) 404, 408
- TAMP (Tariff Authority for Major Ports) 43–45, 48–53, 256–258, 260–262, 314, 523, 524, 543
- Tankages 467, 469
- Tapti 475
- Tariff Authority for Major Ports (*see* TAMP)
- Tariff 368
  - agreement 476
  - amendments 110
  - and dividend reserve 204
  - authorities 63, 523
  - changes 306
  - charge 260
  - commission 27
  - control mechanisms 314
  - coverage 229
  - decisions 530
  - design 112, 132
  - determination 112, 199, 200, 208, 472
  - exercises 527
  - fixation 108, 121, 227, 260, 261, 314
  - formula 110
  - function 306
  - intervention 373
  - notification 261
  - orders 73, 155, 210
  - policies 48, 71, 198, 199, 213, 228, 372, 509, 511, 512
  - policy paper 112
  - policy reform 198, 213
  - proposals 260
  - protection 480, 517
  - rationalization 86, 92, 105, 198, 208, 211, 212
  - rebalancing 325
  - reform 63, 86, 149, 198–201, 238, 412
  - regulation 45, 64, 110–113, 150, 199, 201, 228
  - regulatory authority 43
  - reserve 204
  - setting 64, 65, 82, 97, 187, 219, 230, 259, 260, 305, 365, 367–370, 473, 475, 517, 521, 524, 528
  - structures 63, 69, 84, 86, 97, 98, 132, 204, 260, 280, 307, 325, 369–371, 471, 472, 480
  - electricity 100
  - time-block differentiated 200
  - value-based 306

Tariff-filing directions 396
Tariff-related issues 202
Tariffs 9, 15, 28, 30, 45, 65, 66, 71, 85, 96, 97, 100, 102, 106, 108, 110–113, 122, 125, 137, 140, 143, 144, 149, 152–155, 191, 193–195, 197, 206, 210, 224, 225, 227, 264, 285, 286, 305, 310, 335, 336, 368, 373, 423, 429, 471–474, 476, 479, 497, 522, 524, 527
  crude 460
  discounted 145
  electricity 48
  fluctuations 194
  regulation 201
  restructuring 201
Tariff-setting
  authority 338
  setting process 65
Task Force on Infrastructure 277, 312
Tata Electric Company 76
Tata Energy and Resources Institute 4
Tata Energy Research Institute (*see* TERI)
Tata Teleservices 329
TBR (Transaction of Business Regulations) 1998 44, 258, 260, 261
Techno–economic–environmental–operational ethos 229, 232
Technological
  advances 45
  changes 56, 57, 326
  development 85, 281, 503
  factors 502
  improvements 115
  innovations 224
Technology
  inflows 377
  obsolescence 381
Telecom 43, 63, 321, 325, 326, 330, 339, 342, 359, 368, 373, 385, 526, 527
  activity 328
  administration 368
  and broadcasting 336
  business 389
  Cess 377
  development 368, 369
  equipment manufacturing 321
  industries 41, 368, 385
  infrastructure 326, 328, 377, 527
  licensees 356
  manufacturing 331
  market 372
  model 381
  operators 356, 359
  regulation 335, 341, 359, 361, 374
  revenue streams 381
  services 322, 324, 358, 368, 369, 371
  suppliers 359
  tariff structure 534
  tariffs 377
Telecom network 322, 325, 326, 332, 337, 370
  development: 368
Telecom policy
  framework 326
  revision 356
Telecom sector 6, 39, 42, 43, 323, 328, 329, 337, 338, 341, 342, 359, 363
  development 369
Telecom Regulatory Authority of India (*see* TRAI)
Telecommunication Access Forum (*see* TAF)
Telecommunication
  resources 349
  sector 371
  services 48, 323, 347, 351, 372
Telecommunications Authority, Hong Kong 330
Telecommunications 19, 45, 57, 227, 322, 323 335, 337, 362, 363, 368, 395, 401, 408
  facilities 347
  industry 325
  infrastructure 347
  market 355, 368, 395–398
  operator 356
  penetration 383
  policies 36, 350
  reforms 321, 387
  regulation 362
  sector 37
  service 48, 355, 403
  system 323
  technology 48
Transmission Towers 405
  industry 287, 347
  Department 39, 44, 330, 337
Tele-density 328, 329, 369, 371, 374, 385
Telephone
  services 34, 322, 362, 368
  tariffs 369
Telephony services 346, 349
Television service 364
Telstra 351, 352, 387, 399–402
TERI 4, 20, 23, 46, 415, 416, 497, 503, 534
Terminal
  facilities 305, 450
  handling charges 536
  tariffs 286
Territorial
  contiguity 352
  licensing 352
Thermal power 132, 234
Third-party access 425, 455
Third-party model 128
Three Mile Island disaster 239
Tight power pools 131
Timber
  cargoes 300
  products 299
Time-of-day pricing 209
Time-of-use (*see* TOU)
Tonnage rates 304
TOU (time-of-use) tariff 192, 195, 197, 200
Towage
  charges 276
  operators 265
TPA (Trade Practices Act) 241, 243, 246, 247, 270, 395, 397, 405, 514

TPC (Trade Practices Commission) 275
Trade performance 265
Trade practices 437
Trade Practices Act (*see* TPA)
Trade Practices Commission (*see* TPC)
Trading
  arrangements 16, 139
  policy 511
Traffic projections 283
TRAI Act 43, 45, 258, 324, 325, 333, 338–340, 384
TRAI (Telecom Regulatory Authority of India) 6, 19, 20, 29, 44, 48–53, 257, 262, 323–325, 332, 333, 335, 337, 338, 340, 356, 357, 359–361, 369, 370, 378, 383–385, 428, 526, 527, 533, 543
TRAI–Dot litigation 340
Transactions of Business Regulations (*see* TBR)
Transactions: electricity 183
Transcos 117
Transhipments 302
Transit Authority 183
Transition
  model 388
  period 530
  phase 97, 485
Transitional regulatory environment 33
Transitory
  feature 535
  tribe 537
Transmission and distribution (*see* T&D)
Transmission 7, 10, 20, 58, 71, 73–76, 78–80, 88, 89, 93, 100, 101, 105, 111, 112, 114–118, 120, 122, 123, 125, 130, 135, 137, 141, 146, 151, 201, 203, 213, 243, 251, 420, 472, 473
  access 130
  and switching facilities 358
  assets 142, 210
  charges 209
  companies 49, 135, 136, 143, 150, 233
  congestion 117
  costs 209
  entities 75, 138
  facilities 130, 132, 349
  grid 116–118, 192
  licence 152
  lines 130, 209
  network 137, 421, 248, 507
  operators 421
  organizations 117
  prices 140
  projects 76
  regulation 509
  regulator 505
  revenue regulatory regime 249
  sector 249
  services 116, 117, 138, 142, 152
  system 98, 116–119, 126, 129–131, 133, 149, 188, 326, 421
  tariff 73, 116, 209
  utilities 71, 72
  wires 138, 140
  electric energy 115
  electricity 238, 5
  energy 93
  oil 114
Transparency provisions 50
Transparent tariff structure 371
Transport 240, 267, 464, 469
  costs 247
  gas 424
  infrastructure 493
  links 277
  networks 247
  operators 313
Transportation 123, 137, 144, 362, 417, 420, 429, 442, 464, 465, 470, 473, 475, 479, 497
  business 472
  capacity 130
  costs 280
  limitations 234
  markets 114
  service 142
  tariffs 423, 424, 495
  gas 422
Trawler berth 298
Treasury and Finance: Department 295
Two-part tariff 200
Two-tier arrangement 536

UK Gas Act 424
UK
  experience 55, 57
  Green Paper: Regulating Communications 340
  model 73
  regulator 423
Unbundled
  companies 237
  network 349, 357, 363
Unbundling 349, 371, 422
  costs 372
  services 424
UNCITRAL 415
Underground storage facilities 514
Underpricing: services 360
Uniform
  pricing 145
  pricing standards 36
  tariff 133
  treatment: customers 192
United States (*see* US)
Universal
  service 359
  service funding mechanisms 359
  service objectives 350
  service obligation (*see* USO)
Upstream
  reform 513
  sector 513,481
Urban
  and industrial consumers 235
  areas 64
  distribution systems 235
  households 64
US (United States)
  Congress 36

  - Federal Energy Regulatory Commission 108
  - Office of Technology Assessment 503
  - Senate 114
  - Supreme Court 363
- User
  - charges 535
  - efficiency 307
- USO (universal service obligation) 325, 326, 349, 350, 369, 380, 527
- Utilities 88, 91, 97, 99, 102, 105, 108, 117, 118, 120
- Utility
  - businesses 363
  - functions 309
  - rate case drivers 222
  - regulators 507
  - restructuring strategies 46
  - segment 366
  - services 120
  - tariffs 63

V

- Vadarevu Port 285
- Vadhavan Port 310
- Value-added services 42, 307, 328, 368
- Value-based
  - pricing 305
  - tariff 306
- VCA (Victorian Channels Authority) 269, 272, 288, 291, 293
- Vertically-integrated
  - bodies 11
  - business portfolio 441
  - monopolies 7
  - SEB 72
  - utilities 6, 76, 128
- Vessel turnaround time 280
- Vessel-related charges 307, 314
- Vicpool Rules 242
- Victoria Dock 300, 301
- Victorian Channels Authority (*see* VCA)
- Victorian
  - government 287, 289
  - ports 287
  - reforms 514
  - regional ports 276
  - state electricity market 242
- Video-text services 321
- Videsh Sanchar Nigam Limited (*see* VSNL)
- Village
  - electrification 231
  - public telephone programme (*see* VPT)
- Vision 2000 467
- Vizag Port 311
- Vizhinjam Port 311
- Vodafone 352
- Voice over Internet protocol (*see* VoIP)
- VoIP (voice over Internet protocol) 382
- VPT (village public telephone programme) 359
- VSNL (Videsh Sanchar Nigam Limited) 323

W

- Wage
  - agreements 309
  - structure 313
- WAR (weighted average revenue) 294, 295
- Warehousing corporations 313
- Water utilities 243
- Waterfront monitoring 276
- Waterways Authority 269
- Webb Dock 287, 301
- Western Power and Alinta Gas 244
- Westernport 288
- Wharf
  - handling 305
  - maintenance 269
  - space 305
- Wharfage 291, 298, 302, 305, 306
- White Paper on Regulation 536
- Wholesale
  - competition model 148
  - contract commitments 183
  - electricity markets 245
  - sales: electricity 114
  - supply 138
  - tariffs 131, 140
- Wind
  - electricity 236, 237
  - energy generators 59
- Wireless mobile services 346
- Wireless Planning and Coordination (*see* WPC)
- WLL (wireless in local loop) 382
- World Bank 106
- World oil market 482
- Worldtel 382
- WPC (Wireless Planning and Coordination) 339, 340, 380
- WPC Wing 527

X

- XSPCs 399, 400

Y

- Yardstick regulation 153
- Yarraville 301

Z

- Zonal tariffs 153

Appendix 1

Programme

Transition to a liberalized environment: experiences and issues in regulation 573-578

Wednesday
3 February 1999

10:00–11:00 **Inaugural session**

- Welcome address
  Dr R K Pachauri, Director, TERI, New Delhi, India
- Opening remarks
  Independent regulation and infrastructure development
  Mr Deepak Parekh, Chairman, IDFC (Infrastructure Development Finance Company Ltd), Mumbai, India
- Keynote address
  Developments in competition and regulation of the British electricity industry
  Prof. Stephen C Littlechild, Former Director General of Electricity Supply, Office of Electricity Regulation, UK
- Inaugural address
  Mr Jagmohan, Hon'ble Minister for Communications, GoI (Government of India), New Delhi
- Special address
  Linda K Breathitt, Commissioner, Federal Energy Regulatory Commission, Washington, DC, USA
- Vote of thanks
  Dr Leena Srivastava, Dean, Regulatory Studies and Governance Division, TERI, New Delhi, India

11:30–12:30 **Plenary session 1 Policy and legal framework for regulation**

Chairperson
Prof. S L Rao, Chairman, CERC (Central Electricity Regulatory Commission), New Delhi, India
Speakers

- *Dr Raymond W Lawton*, Director, The National Regulatory Research Institute, Columbus, Ohio, USA
- *Mr S Sundar*, Distinguished Fellow, TERI, New Delhi, India

12:30–13:30 **Plenary session 2 Issues in tariff/pricing**

Chairperson
Dr Shankar N Acharya, Chief Economic Adviser, Ministry of Finance, GoI, New Delhi
Speakers

- *Dr R K Pachauri*, Director, TERI, New Delhi, India
- *Dr Rakesh Mohan*, Director-General, National Council of Applied Economic Research, New Delhi, India

POWER

14:15–15:45 **Session 1 Regulatory framework**

Chairperson

Dr Uddesh Kohli, Chairman and Managing Director, Power Finance Corporation Ltd, New Delhi, India

Speakers

- *Mr M G Ramachandran*, Legal Consultant, New Delhi, India
- *Mr D K Roy*, Member, OERC (Orissa Electricity Regulatory Commission), Bhubaneswar, India
- *Mr Alan F Townsend*, Private Sector Development Specialist, The World Bank, Washington, DC, USA
- *Ms Linda K Breathitt*, Commissioner, Federal Energy Regulatory Commission, Washington, DC, USA

16:00–17:30 **Session 2 Market structure**

Chairperson

Mr D P Sinha, Member (E), CERC, New Delhi, India

Co-Chairperson

Dr T L Sankar, Principal, Administrative Staff College of India, Hyderabad

Speakers

- *Mr R V Shahi*, Chairman and Managing Director, BSES Ltd, Mumbai, India
- *Mr K Ramanathan*, Senior Fellow, TERI, New Delhi, India
- *Mr Michael B Rosenzweig*, Senior Vice President, National Economic Research Associates, Washington, DC, USA
- *Mr Sohail Hasnie*, Manager, Office of the Regulator-General, Melbourne, Australia
- *Mr James Connelly*, Commissioner, Massachusetts Department of Telecommunications and Energy, Boston, USA

Thursday
4 February 1999

10:00–11:30 **Session 3 Tariff setting**

Chairperson

Mr S C Mahalik, Chairman, OERC, Bhubaneswar, India

Speakers

- *Prof. Chaim Elata*, Chair, Public Utilities Authority – Electricity, Jerusalem, Israel
- *Mr Sanjeev S Ahluwalia*, Secretary, CERC, New Delhi, India
- *Mr Bhanu Bhusan*, Director (Operations), Power Grid Corporation of India Ltd, New Delhi, India
- *Ms Mary Clark Webster*, Director, International Resources Group, New Delhi, India

11:45–13:15 **Session 4 Regulatory reforms: present and future strategies**

Chairperson

P I Suvrathan, Joint Secretary, Ministry of Power, GoI, New Delhi

Speakers

- *Prof. Manubhai Shah*, Managing Trustee, Consumer Education and Research Centre, Ahmedabad, India

- *Dr B S K Naidu*, Director-Technical, Rural Electrification Corporation, New Delhi, India
- *Dr Ajay Mathur*, Dean, Energy–Environment Technology Division, TERI, New Delhi, India
- *Mr Jim Bever*, Deputy Director, United States Agency for International Development, New Delhi, India
- *Mr Allan Asher*, Deputy Chairperson, Australian Competition and Consumer Commission, Dickson ACT, Australia

PORTS

Wednesday
3 February 1999

14:15–15:45 **Session 1 Regulatory framework**
Chairperson
Mr S Sathyam, Chairman, TAMP (Tariff Authority for Major Ports), New Delhi, India
Speakers

- *Mr S Venkiteswaran*, Senior Advocate, Mumbai, India
- *Mr Allan Asher*, Deputy Chairperson, Australian Competition and Consumer Commission, Dickson ACT, Australia

16:00–17:30 **Session 2 Market structure**
Chairperson
Mr S Sundar, Distinguished Fellow, TERI, New Delhi, India
Speakers

- *Mr Nikhil Gandhi*, Vice Chairman and Managing Director, Gujarat Pipavav Port Ltd, Mumbai, India
- *Mr R R Sinha*, Deputy Chairman, Bombay Port Trust, Mumbai, India
- *Mr Amal Chakravorty*, Managing Director, Indian Ports Association, New Delhi, India

Thursday
4 February 1999

10:00–11:30 **Session 3 Tariff setting**
Chairperson
Dr Urjit R Patel, Executive Vice President, IDFC, Mumbai, India
Speakers

- *Mr Sohail Hasnie*, Manager, Office of the Regulator-General, Melbourne, Australia
- *Mr Arnold John*, Consultant, TAMP, New Delhi, India
- *Mr Swapan Chakrabarti*, Deputy Chairman, Haldia Dock Complex, Calcutta Port Trust, Calcutta, India

11:45–13:15 **Session 4 Regulatory reforms: present and future strategies**
Chairperson
Mr S Sathyam, Chairman, TAMP, New Delhi, India
Speakers

- *Mr M P Pinto*, Chairman, Jawaharlal Nehru Port Trust, Mumbai, India
- *Mr Arnold John*, Consultant, TAMP, New Delhi, India

- *Mr Nikhil Gandhi*, Chairman and Managing Director, Gujarat Pipavav Port Ltd, Mumbai, India
- *Mr Edward Sheppard*, Regulatory/Public Law Expert, The Cornell Group Inc., New Delhi, India

TELECOM

Wednesday
3 February 1999

14:15–15:45 **Session 1 Regulatory framework**
Chairperson
Justice S S Sodhi, Chairperson, TRAI (Telecom Regulatory Authority of India), New Delhi, India
Speakers

- *Mr T H Chowdary*, Director, Centre for Telecom Management & Studies, and Information Technology Advisor, Government of Andhra Pradesh, Hyderabad, India
- *Dr Mahesh Uppal*, Director, Telecommunications and Computer Information Systems, New Delhi, India
- *Mr T V Ramachandran*, Executive Vice Chairman, Cellular Operators Association of India, New Delhi, India
- *Mr S Kulkarni*, Director, Prime Minister's Office, GoI, New Delhi
- *Mr Virat Bhatia*, Managing Director, AT&T, New Delhi, India

16:00–17:30 **Session 2 Market structure**
Chairperson
Mr B K Zutshi, Vice Chairperson, TRAI, New Delhi, India
Speakers

- *Mr M Z Doja*, General Manager, Bell Canada, Carrier Services-Interconnection, Ottawa
- *Mr Ashok Barat*, Regional Director, Telstra India Pvt. Ltd, New Delhi, India
- *Mr Richard D French*, Resident and Chief Executive Officer, Tata Communications Ltd, Hyderabad, India
- *Mr James Connelly*, Commissioner, Massachusetts Department of Telecommunications and Energy, Boston, USA

Thursday
4 February 1999

10:00–11:30 **Session 3 Tariff setting**
Chairperson
Mr M Ravindra, Member, TRAI, New Delhi, India
Speakers

- *Mr Fred G Bigham*, Director, Economic & Corporate Projects, CRTTC (Canadian Radio-television and Telecommunication Commission), Ottawa, Canada
- *Mr Dave Lindsay*, Consultant, CRTTC, Ottawa, Canada
- *Mr S P Purwar*, Adviser (Finance), Telecom Commission, Department of Telecommunications, GoI, New Delhi

- *Dr Harsha Vardhana Singh*, Economic Adviser, TRAI, New Delhi, India

11:45–13:15 **Session 4 Regulatory reforms: present and future strategies**
Chairperson
Mr U P Singh, Member, TRAI, New Delhi, India
Speakers
- *Mr K Vijay Rao*, Chief Executive Officer, Escotel Mobile, New Delhi, India
- *Mr Hemant Luthra*, Chief Executive Officer, ESSAR Comvission, New Delhi, India
- *Mr Eric Buerkler*, Chief Executive Officer, Sterling Cellular Ltd, New Delhi, India
- *Mr Allan Asher*, Deputy Chairperson, Australian Competition and Consumer Commission, Dickson ACT, Australia

OIL & GAS

Wednesday
3 February 1999

14:15–15:45 **Session 1 Regulatory framework**
Chairperson
Mr Surajit Chaliha, Director, Geo Enpro Petroleum Ltd, New Delhi, India
Speakers
- *Mr Jyoti Sagar*, Managing Partner, J Sagar Associates, New Delhi, India
- *Mr R K Narang*, Distinguished Fellow, TERI, New Delhi, India
- *Mr M S Ramachandran*, Executive Director, Oil Coordination Committee, New Delhi, India
- *Mr J M B Baruah*, Managing Director, Prize Petroleum Company Ltd, New Delhi, India
- *Mr R P Sharma*, Director (Commercial), Petronet LNG Ltd, New Delhi, India

16:00–17:30 **Session 2 Market structure**
Chairperson
Mr R K Narang, Distingushed Fellow, TERI
Speakers
- *Mr P Raghavendran*, Senior Vice President, Reliance Petroleum Ltd, Mumbai, India
- *Mr R K Batra*, Adviser (Oil and Gas), TERI, New Delhi, India
- *Mr S Behuria*, Director (Marketing), Bharat Petroleum Corporation Ltd, Mumbai, India
- *Mr S N Jha*, Director, IOC (Indian Oil Corporation Ltd), New Delhi, India

Thursday
4 February 1999

10:00–11:30 **Session 3 Tariff setting**
Chairperson
Mr R K Narang, Distinguished Fellow, TERI, New Delhi, India
Speakers
- *Mr J K Jain*, Director (Finance), Gas Authority of India Ltd, New Delhi, India

- *Mr Larry B Morse*, Vice President and Country Manager, Enron Oil and Gas India, Ltd, New Delhi, India
- *Mr V K Chawla*, Consultant, Reliance Petroleum Ltd, Mumbai, India

11:45–13:15 **Session 4 Regulatory reforms: present and future strategies**
Chairperson
Mr Devi Dayal, Additional Secretary, MoPNG (Ministry of Petroleum and Natural Gas), GoI, New Delhi
Speakers
- *Mr Subir Raha*, Director (Human Resources), IOC, New Delhi, India
- *Dr Leena Srivastava*, Dean, TERI, New Delhi, India
- *Dr Joanne M Kauffman*, Centre for Environmental Initiatives, Massachusetts Institute of Technology, Cambridge, USA
- *Mr Allan Asher*, Deputy Chairperson, Australian Competition and Consumer Commission, Dickson ACT, Australia

Concluding session

14:00–14:45 Presentation of session discussions before the panellists
- Power
  Mr Gaurav Bhatiani, Research Associate, TERI, New Delhi, India
- Ports
  Mr C S Venkatraman, Chief Executive Officer, Indian Ports Association, New Delhi, India
- Telecom
  Mr M Karuppasamy, Dean, TERI, New Delhi, India
- Oil and Gas
  Rahul Deep Singh, Research Associate, TERI, New Delhi, India

14:45–16:15 Panel discussion
Chairperson
Prof. Y K Alagh, Member of Parliament (Rajya Sabha), GoI, New Delhi
Panellists
- *B K Zutshi*, Vice Chairperson, TRAI, New Delhi, India
- *Prof. S L Rao*, Chairman, CERC, New Delhi, India
- *Mr S Sathyam*, Chairman, TAMP, New Delhi, India
- *Mr Devi Dayal*, Additional Secretary, MoPNG, GoI, New Delhi
- *Mr D S Narain*, Member, Insurance Regulatory Authority, New Delhi, India
- *Mr Nasser Munjee*, Deputy Managing Director, IDFC, Mumbai, India

16:15–16:30
- Concluding remarks
  Dr R K Pachauri, Director, TERI, New Delhi, India
- Vote of thanks
  Dr S K Sarkar, Senior Fellow, TERI, New Delhi, India

Appendix 2

List of speakers

Transition to a liberalized environment: experiences and issues in regulation 579-584

Dr Shankar N Acharya
Chief Economic Adviser
Ministry of Finance
Government of India
North Block
New Delhi - 110 001, India
Tel. +91 11 301 4818
Fax +91 11 301 5610
E-mail cea@finance.delhi.nic.in

Mr Sanjeev S Ahluwalia
Secretary
Central Electricity Regulatory Commission
Core 3, V Floor
SCOPE Complex
3 Institutional Area
Lodi Road
New Delhi - 110 003
India
Tel. +91 11 436 1051
Fax +91 11 436 0010

Prof. Y K Alagh
Member of Parliament (Rajya Sabha)
Government of India
New Delhi - 110 001
Tel. +91 11 338 1535
Fax +91 11 338 4318
E-mail alagh@parlis.nic.in

Mr Allan Asher
Deputy Chairperson
Australian Competition & Consumer Commission
PO Box 1199
Dickson ACT 2602
Australia
Tel. +61 2 6243 1138
Fax +61 2 6243 1122
E-mail allan.asher@accc.gov.au

Mr Ashok Barat
Regional Director
Telstra India Pvt. Ltd
501-507, Tolstoy House
Tolstoy Marg
New Delhi - 110 001, India
Tel. +91 11 373 8681-6
Fax +91 11 335 5997 or 335 5987

Mr J M B Baruah
Managing Director
Prize Petroleum Company Ltd
7th Floor, Kailsah Building
26, Kasturba Gandhi Marg
New Delhi - 110 001, India
Tel. +91 11 331 3024 or 331 2986
Fax +91 11 331 2996
E-mail prizepet@bol.net.in

Mr R K Batra
Adviser (Oil & Gas)
TERI, Darbari Seth Block
Habitat Place, Lodhi Road
New Delhi - 110 003, India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail rkbatra@teri.res.in

Mr S Behuria
Director (Marketing)
Bharat Petroleum Corporation Ltd
Bharat Bhavan
4 & 6, Cumimbhoy Road
Ballard Estate, PB No. 688
Mumbai - 400 001, India
Tel. +91 22 261 8281
Fax +91 22 261 6793

Mr Jim Bever
Deputy Director
US Agency for International Development
American Embassy
Chanakyapuri
New Delhi - 110 021
India

Mr Virat Bhatia
Managing Director
AT&T
Mohan Dev House
13, Tolstoy Marg
New Delhi - 110 001
India
Tel. +91 11 373 8059
Fax +91 11 331 0356

Mr Gaurav Bhatiani
Research Associate
TERI, Darbari Seth Block
Habitat Place
Lodhi Road
New Delhi - 110 003
India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail gauravb@teri.res.in

Mr Bhanu Bhushan
Director (Operations)
Power Grid Corporation of India Limited
Hemkunt Chambers
89 Nehru Place
New Delhi - 110 019
India
Tel. +91 11 642 8808
Fax +91 11 642 8357

Mr Fred G Bigham
Director
Canadian Radio-television and Telecommunications Commission
Ottawa
Ontario, K1A 0N2
Canada
Tel. +1 613 997 3430
Fax +1 613 853 1555
E-mail fred.bigham@crtc.x400.gc.ca

Ms Linda K Breathitt
Commissioner
Federal Energy Regulatory Commission, USA
888, Ist Street
NE Washington, DC 20426
USA
Tel. +1 202 208 0377
Fax +1 202 208 0674
E-mail linda.breathitt@ferc.fed.us

Mr Eric Buerkler
CEO
Sterling Cellular Limited
II Floor, Chander Lok Building
Janpath
New Delhi – 110 001
India

Mr Swapan Chakrabarti
Deputy Chairman
Calcutta Port Trust
Haldia Dock Complex
15, Strand Road
Calcutta – 700 001, India
Tel. +91 33 220 5370
Fax +91 33 220 8226

Mr Amal Chakravorty
Managing Director
Indian Ports Association
19, Institutional Area
Lodi Road
New Delhi – 110 003
India
Tel. +91 11 469 9284–87
Fax +91 11 462 0996 or 463 6204
E-mail ipa@x400.nicgw.nic.in or ipadel@nda.vsnl.net.in

Mr Surajit Chaliha
Director
Geo Enpro Petroleum Ltd
19th Floor, Amba Deep
14, K G Marg
New Delhi – 110 001, India
Tel. +91 11 331 0887 or 332 9444
Fax +91 11 332 9441 or 331 0819

Mr V K Chawla
Consultant
Reliance Petroleum Ltd
Brindvan, 4th Floor
Sree Ram Mill Compound
Ganapatrao Kadam Marg
Lower Parel
Mumbai – 400 013, India
Tel. +91 22 4960370
Fax + 91 22 4965573

Mr T H Chowdary
Director
Centre for Telecom Management and Studies
AP Information Technologies
Parisarama Bhawan, 6th Floor
Fateh Maidan
Hyderabad – 500 004, India
Tel. +91 40 784 6137
Fax +91 40 784 4520
E-mail thc_ctms@hydbad.tcs.co.in

Mr James Connelly
Commissioner
Commonwealth of Massachusetts
Department of Telecommunications and Energy
One South Station
Boston, MA 02110, USA
Tel. +1 617 305 3500
Fax +1 617 345 9101
E-mail James.Connelly@DPU.state.ma.us

Mr Devi Dayal
Additional Secretary
Ministry of Petroleum and Natural Gas
Shastri Bhavan, Dr Rajendra Place
New Delhi – 110 001, India
Tel. +91 11 338 1052

Mr M Zia Doja
General Manager
Carrier Services
160 Elgin Street, Suite 920
Ottawa, Ontario K2P 2C4
Canada
Tel. +1 613 785 2644
Fax +1 613 781 5544
E-mail Ziadoja@post.bell.ca

Prof. Chaim Elata
Chair
Public Utilities Authority - Electricity
1 Soreg Street
Jerusalem 94145, Israel
Tel. + 972 2 6416855
Fax + 972 2 6416293

Mr Richard D French
Resident & CEO
Tata Communications Ltd
5-9-62, KLK Estate
Fateh Maidan Road
Hyderabad – 500 001, India
Tel. +91 40 211999
Fax +91 40 241286
E-mail richard@tatacell.com

Mr Nikhil Gandhi
Vice Chairman & Managing Director
Gujarat Pipavav Port Ltd
Pipavav House
209, Bank Street Cross Lane Fort
Mumbai – 400 023, India
Tel. +91 22 270 3031
Fax +91 22 263 4621 or 269 6023

Mr Sohail Hasnie
(Former Manager, Office of the Regulator-General, Australia)
Presently
Director
London Economics Australia
Suite 513, 89 High Street
Kew Melbourne 3101
Australia
Tel. +61 3 9854 6279
Fax +61 3 9855 1066
E-mail sohail.hasnie@londecon.com.au

Mr Jagmohan
(Former Minister for Communications, Government of India)
Presently
Minister for Urban Development
Government of India
Nirman Bhavan
New Delhi – 110 011

Mr J K Jain
Director (Finance)
Gas Authority of India Limited
16, Bikaji Cama Place
R K Puram
New Delhi – 110 066
India
Tel. +91 11 618 2955 or 617 2580
Fax +91 11 618 5941

S N Jha
Director
Indian Oil Corporation Ltd
SCOPE Complex, Core-2
7, Institutional Area
Lodhi Road
New Delhi – 110 003, India
Tel. +91 11 436 2036
Fax +91 11 436 4355

Mr Arnold John
Consultant
Tariff Authority for Major Ports
Gate No. 30, 2nd Floor
Jawaharlal Nehru Stadium
New Delhi – 110 003
India

Mr Rakesh Kapur
Joint Secretary
Telecom Regulatory Authority of India
16th Floor, Jawahar Vyapar Bhawan
1 Tolstoy Marg
New Delhi – 110 001
India
Tel. +91 11 373 7272
Fax +91 11 331 6780 or 373 8708

Mr M Karuppasamy
Dean
TERI
Darbari Seth Block
Habitat Place
Lodhi Road
New Delhi – 110 003, India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail karups@teri.res.in

Dr Joanne M Kauffman
Massachusetts Institute of Technology
77, Massachusetts Ave
Building 1-138, Cambridge
MA 02139, USA
Tel. +1 617 253 0769
Fax +1 617 258 6099
E-mail jmkauffm@mit.edu

Dr Uddesh Kohli
Chairman & Managing Director
Power Finance Corporation Ltd
Chandra Lok
36 Janpath
New Delhi – 110 001
India
Tel. +91 11 331 5824
Fax +91 11 371 7108
E-mail ukohli@teri.nic.in

Mr S Kulkarni
Director
Prime Minister's Office
Gate No. 5, South Block
New Delhi – 110 001, India
Tel. +91 11 301 3149
Fax +91 11 301 7931

Dr Raymond W Lawton
Director
The National Regulatory Research Institute
1080 Carmack Road
Columbus
Ohio 43210-1002
USA
Tel. +1 614 292 7196
E-mail lawton.1@osu.edu

Mr Dave Lindsey
Consultant
Canadian Radio-television and Telecommunications Commission
Ottawa, Ontario, K1A 0N2
Canada

Prof. Stephen C Littlechild
Former Director General
Electricity Supply, UK
Whitehouse
The Green Tanworth-in-Arden
Solihull, West Midlands
B94 5AL, UK
Tel. +44 1564 74 2502
Fax. + 44 1564 74 2793
E-mail littlechild@tanworth.mercianet.co.uk

Mr Hemant Luthra
CEO
ESSAR Comvission
21, Feroz Gandhi Road
Lajpat Nagar IV
New Delhi – 110 024, India
Tel. +91 11 684 9546
Fax +91 11 684 4370

Mr S C Mahalik
Chairman
Orissa Electricity Regulatory Commission
Bidyut Niyamak Bhavan
Unit VIII, Kalyani Market Complex
Bhubaneswar – 752 001, India
Tel. +91 674 413097, 414117, or 418277
Fax +91 674 413306
E-mail orierc@dte.vsnl.net.in

Dr Ajay Mathur
Dean
TERI
Darbari Seth Block
Habitat Place
Lodhi Road
New Delhi – 110 003, India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail amathur@teri.res.in

Dr Rakesh Mohan
Director-General
National Council of Applied Economic Research
Parisila Bhawan
11 Indraprastha Estate
New Delhi – 110 002, India
Tel. +91 11 331 7860–68
Fax +91 11 332 7164

Mr Larry B Morse
Vice President and Country Manager
Enrol Oil & Gas India, Ltd
Suite 702-708, 7th Floor
Meridien Commercial Tower (W)
Windser Place, Raisana Road
New Delhi – 110 001, India
Tel. +91 11 335 8562
Fax +91 11 335 8563

Mr Nasser Munjee
Dy Managing Director
Infrastructure Development Finance Co Ltd
Raman House, 169 Backbay Reclamation
Mumbai – 400 020, India
Tel. +91 22 204 6986
Fax +91 22 285 0078
E-mail
nmunjee@giasbm01.vsnl.net.in

Mr B S K Naidu
Director - Technical
Rural Electrification Corpn
Core-4, SCOPE Complex
Lodhi Road
New Delhi – 110 003, India
Tel. +91 11 436 1851 or 436 1562
Fax +91 11 461 0461 or 461 6948

Mr D S Narain
Member
Insurance Regulatory Authority
Ministry of Finance
Ground Floor, Jeevan Bharati Bldg
Tower I, Connaught Place
New Delhi – 110 001, India
Tel. +91 11 332 0866
Fax +91 11 335 7320

Mr R K Narang
Distinguished Fellow
TERI
Darbari Seth Block
Habitat Place, Lodhi Road
New Delhi – 110 003, India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail rknarang@teri.res.in

Dr R K Pachauri
Director
TERI
Habitat Place
Darbari Seth Block
Lodhi Road
New Delhi – 110 003, India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 460 1770 or 463 2609
E-mail pachauri@teri.res.in

Mr Deepak Parekh
Chairman
Infrastructure Development Finance Co Ltd
169, Backbay Reclamation
Mumbai – 400 010, India
Tel. +91 22 282 0929
Fax +91 22 285 0078

Dr Urjit R Patel
Executive Vice President
Infrastructure Development Finance Co Ltd
169, Backbay Reclamation
Mumbai – 400 010, India
Tel. +91 22 282 0929
Fax +91 22 285 0078

Mr M P Pinto
Chairman
Jawaharlal Nehru Port Trust
Administration Building
Sheva
Navi Mumbai – 400 707
India
Tel. +91 22 724 2623
Fax +91 22 724 2325
E-mail
jawahar@giasbm01.vsnl.net.in

Mr S P Purwar
Adviser (Finance)
Telecom Commission
Department of Telecommunications
Sanchar Bhawan
20, Ashok Road
New Delhi – 110 001
India

Mr P Raghavendran
Sr Vice President
Reliance Petroleum Ltd
Brindvan
4th Floor
Sree Ram Mill Compound
Ganapatrao Kadam Marg
Lower Parel
Mumbai – 400 013
India
Tel. +91 22 4960370
Fax + 91 22 4965573

Mr Subir Raha
Director (Human Resources)
Indian Oil Corporation Ltd
Core-2
SCOPE Complex
7, Institutional Area
Lodhi Road
New Delhi – 110 003
India
Tel. +91 11 436 2036
Fax +91 11 436 4355
E-mail raha@iocl.co.in

Mr M G Ramachandran
Legal Consultant
B-12, 2nd Floor
Kalindi Colony
New Delhi – 110 065
India
Tel. +91 11 683 1065 or 692 6102

Mr M S Ramachandran
Executive Director
Oil Coordination Committee
2nd Floor, Core-8
SCOPE Complex
7, Institutional Area
Lodhi Road
New Delhi – 110 003, India
Tel. +91 11 436 2486

Mr T V Ramachandran
Executive Vice Chairman
Cellular Operators Association of India
A-101
Gauri Sadan
5, Hailey Road
New Delhi - 110 001
India
Tel. +91 11 335 0369
Fax +91 11 335 0371
E-mail coai@ndc.vsnl.net.in

Mr K Ramanathan
Senior Fellow
TERI
Darbari Seth Block
Habitat Place, Lodhi Road
New Delhi - 110 003, India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail krnathan@teri.res.in

Prof. S L Rao
Chairman
Central Electricity Regulatory Commission
Core 3, V Floor
SCOPE Complex
3 Institutional Area
Lodi Road
New Delhi - 110 003, India
Tel. +91 11 436 1051
Fax +91 11 436 0010

Mr K Vijay Rao
CEO, Escotel Mobile
103, Friends Colony
New Delhi - 110 0065, India
Tel. +91 11 691 5646

M Ravindra
Member
Telecom Regulatory Authority of India
16th Floor, Jawahar Vyapar Bhawan
1 Tolstoy Marg
New Delhi - 110 001
India
Tel. +91 11 373 7272
Fax +91 11 373 8708

Mr Michael B Rosenzweig
Sr Vice President
National Energy Research Associates
1255 23rd Street NW
Washington, DC 20037, USA
Tel. +1 202 466 9231
Fax +1 202 46 9253

Mr D K Roy
Member
Orissa Electricity Regulatory Commission
Bidyut Niyamak Bhavan
Unit VIII, Kalyani Market Complex
Bhubaneswar - 752 001, India
Tel. + 91 674 413097 or 414117
Fax + 91 674 413306 or 419781
E-mail orierc@dte.vsnl.net.in

Mr Jyoti Sagar
Managing Partner
J Sagar Associates
84-E, C-6 Lane (Off Central Avenue)
Sainik Farms
New Delhi - 110 062, India
Tel. +91 11 651 8714-16
Fax +91 11 651 8717 or 688 6070
E-mail legal@salaw.com

Dr T L Sankar
Principal
Administrative College of India
Hyderabad, India
Fax +91 40 331 2954

Dr S K Sarkar
Senior Fellow
TERI
Darbari Seth Block
Habitat Place
Lodhi Road
New Delhi - 110 003
India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail sksarkar@teri.res.in

Mr S Sathyam
Chairman
Traffic Authority for Major Ports
Gate No. 30
Second Floor
Jawaharlal Nehru Stadium
New Delhi - 110 003
India
Tel. +91 11 461 4817
Fax +91 11 464 3676

Prof. Manubhai Shah
Managing Trustee
Consumer Education and Research Centre
'Suraksha Sankool'
Thaltej, Ahmedabad-Gandhinagar Highway
Ahmedabad - 380 054
India
Tel. +91 79 748 9945-46
Fax +91 79 748 9947
E-mail cerc@wilnetonline.net

Mr R V Shahi
CMD
BSES Limited
BSES House
Santacruz (E)
Mumbai - 400 055
India
Tel. +91 22 615 4290
Fax +91 22 615 4291

Mr R P Sharma
Director (Commercial)
Petronet LNG Limited
World Trade Centre
First Floor
Babar Road, Babar Lane
New Delhi - 110 001
India
Tel. +91 11 331 1016
Fax +91 11 332 4839

Mr Edward Sheppard
Regulatory/Public Law Expert
The Cornell Group Inc.
2nd Floor, Jawaharlal Nehru Stadium
New Delhi - 110 003, India
Tel. +91 11 460 4439
Fax +91 11 460 4439

Mr Harsha Vardhana Singh
Economic Adviser
Telecom Regulatory Authority of India
16th Floor, Jawahar Vyapar Bhawan
1 Tolstoy Marg
New Delhi – 110 001, India
Tel. +91 11 373 7272
Fax +91 11 373 8708

Mr Rahul Deep Singh
Research Associate
TERI, Darbari Seth Block
Habitat Place, Lodhi Road
New Delhi – 110 003, India
Tel. +91 11 462 2246 or 462 1550
Fax +91 11 462 1770 or 463 2609
E-mail rdsingh@teri.res.in

Mr U P Singh
Member
Telecom Regulatory Authority of India
16th Floor, Jawahar Vyapar Bhawan
1 Tolstoy Marg
New Delhi – 110 001, India
Tel. +91 11 373 7272
Fax +91 11 373 8708

Mr D P Sinha
Member (E)
Central Electricity Regulatory Commission
Core 3, V Floor
SCOPE Complex
3 Institutional Area
Lodi Road
New Delhi – 110 003, India
Tel. +91 11 436 1051
Fax +91 11 436 0010

Mr R R Sinha
Deputy Chairman
Mumbai Port Trust
Shoorji Vallabhadas Marg
Mumbai - 400 001, India
Fax +91 22 261 1373

Justice S S Sodhi
Chairperson
Telecom Regulatory Authority of India
16th Floor, Jawahar Vyapar Bhawan
1 Tolstoy Marg
New Delhi – 110 001, India
Tel. +91 11 373 7272
Fax +91 11 373 8708

Dr Leena Srivastava
Dean
TERI
Darbari Seth Block
Habitat Place, Lodhi Road
New Delhi – 110 003, India
Tel. +91 11 462 2246 or 462 1550
Fax +91 11 462 1770 or 463 2609
E-mail leena@teri.res.in

Mr S Sundar
Distinguished Fellow
TERI
Darbari Seth Block
Habitat Place, Lodhi Road
New Delhi – 110 003, India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 460 1770 or 463 2609
E-mail ssundar@teri.res.in

Mr P I Suvrathan
Joint Secretary
Ministry of Power
Government of India
Shram Shakti Bhawan
Rafi Marg
New Delhi – 110 001
Tel. +91 11 371 5327
Fax +91 11 371 7519

Mr Alan F Townsend
The World Bank
1818 H Street
NW Washington, DC
USA
Fax +1 202 522 3481

Dr Mahesh Uppal
Director
Telecommunications and Computer Information Systems
49 Golf Links, 2nd Floor
New Delhi – 110 003, India
Tel. +91 11 463 6773
Fax +91 11 464 8068
E-mail muppal@del3.vsnl.net.in

Mr C S Venkatraman
CEO
Indian Ports Association
19 Institutional Area
Lodi Road
New Delhi – 110 003, India
Tel. +91 11 463 4029
Fax +91 11 462 0996 or 463 6204

Mr S Venkiteswaran
Senior Advocate
Maker Chambers III
Suite 114-B, Nariman Point
Mumbai – 400 021, India
Tel. +91 22 285 2789 or 285 2792
Fax +91 22 285 2086
E-mail svenky@bom3.vsnl.net.in

Ms Mary Clark Webster
Director
International Resources Group
C/o Mr R H Leasburg
B-20, Mayfair
Ist Floor, Hauz Khas
New Delhi – 110 016
Tel. +91 11 681 61613
Fax +91 11 686 1676

Mr B K Zutshi
Vice Chairperson
Telecom Regulatory Authority of India
Jawahar Vyapar Bhawan
1 Tolstoy Marg
New Delhi – 110 001, India
Tel. +91 11 335 6523
Fax +91 11 373 8708

Appendix 3

List of participants

Transition to a liberalized environment: experiences and issues in regulation 585-595

Mr P K Agarwal
Director
Oil Coordination Committee
2nd Floor, Core-8
SCOPE Complex
7, Institutional Area
Lodhi Road
New Delhi – 110 003
India
Tel. +91 11 436 2486

Mr V S Ailawadi
Chairman
Haryana Electricity Regulatory Commission
SCO 180, Sector 5
Panchkula
Haryana
India

Mr Kishor Apte
Deputy Chairman
Jawaharlal Nehru Port Trust
Administration Building
Sheva
Navi Mumbai – 400 707
India
Tel. +91 22 724 2623
Fax +91 22 724 2325
E-mail jnport@bom3.vsnl.net.in

Ms Pamy Arora
Team Leader
The Cornell Group Inc.
2nd Floor, Jawaharlal Nehru Stadium
New Delhi – 110 003
India
Tel. +91 11 460 4439
Fax +91 11 460 4439

Mr Subrata Bagchi
Finance Department
TCG Refineries Limited
9 B Wood Street
Calcutta – 700 089
India
Tel. +91 33 280 4869
Fax +91 33 240 3016
E-mail *subroto@tcgind.com*

Mr Aashish Bansal
Sr Manager - Energy Management Group
HSBC Investment Banking
HSBC Capital Markets India Pvt Ltd
Ashoka Estate (3rd Floor)
24, Barakhamba Road
New Delhi – 110 001
India
Tel. +91 11 373 1234
Fax +91 11 373 7691

Mr Sukhbilas Barma
Secretary
Department of Power
Government of West Bengal
New Secretariat Building
1 K S Roy Road
Calcutta – 700 001
India
Tel. +91 33 248 1267
Fax +91 33 221 4961

Mr Ed Beebee
Canadian Radio-television and Telecommunications Commission
Ottawa
Ontario, K1A 0N2
Canada

Mr Pramod Bhandari
Senior Vice President
JM Baxi & Co
C/o JP House, Ground Floor
Near Asian Games Village
New Delhi – 110 049, India
Tel. +91 11 649 4201-5
Fax +91 11 649 4206

Mr M A Bhaskarachar
Financial Adviser & Chief Accounts Officer
New Mangalore Port Trust
Panambur
Mangalore – 575 010, India
Tel. +91 824 407353
Fax +91 824 408390
E-mail nmpt@x400.nicgw.nic.in

Mr D P Bhatnagar
Under Secretary
Tariff Authority for Major Ports
Gate No. 30, Second Floor
Jawaharlal Nehru Stadium
New Delhi – 110 003, India
Tel. +91 11 461 4817
Fax +91 11 464 3676
E-mail tamp@alpha.nic.in

Ms Anuja Bitta
Research Associate
TERI
Darbari Seth Block
Habitat Place, Lodhi Road
New Delhi – 110 003, India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail anujab@teri.res.in

Mr R K Chadha
Chief Engineer
BSES Limited
910, New Delhi House
27, Barakhamba Road
New Delhi – 110 001, India
Tel. +91 11 331 3385
Fax +91 11 335 1673

Mr J Chakraborthy
Chief Manager (Operations)
Jawaharlal Nehru Port Trust
Administration Building
Sheva, Navi Mumbai – 400 707
India
Tel. +91 22 724 2623
Fax +91 22 724 2325
E-mail jawahar@giasbm01.vsnl.net.in

Mr Satish Chander
Secretary
Traffic Authority for Major Ports
Gate No. 30, Second Floor
Jawaharlal Nehru Stadium
New Delhi – 110 003, India
Tel. +91 11 461 4817
Fax +91 11 464 3676
E-mail tamp@alpha.nic.in

Mr Ramesh Chandra
Member, Haryana Electricity Regulatory Commission
SCO 180, Sector 5
Panchkula, Haryana, India

Mr N Chandrasekharan
Organisational Expert
Enhanced India Port Policy Implementation Study
57, Nehru Place
New Delhi – 110 019, India
Tel. +91 11 646 7691
Fax +91 11 653 1915

Mr S N Chattopadhyay
Expert, K-1/45, Chittaranjan Park
New Delhi – 110 019, India
Tel. +91 11 622 0548 or 621 2645
Fax +91 11 621 6284
E-mail cesinter@nda.vsnl.net.in

Mr K S Chaube
Member
Haryana Electricity Regulatory Commission
SCO 180, Sector 5
Panchkula
Haryana
India

Mr Luv Chhabra
Managing Director
Petronet India Limited
ECE House
28 A, K G Marg
New Delhi – 110 001
India
Tel. +91 11 373 8571
Fax +91 11 373 6207 or 331 6894

Mr Puneet Chitkara
Officer on Special Duty
Central Electricity Regulatory Commission
Core 3, V Floor
SCOPE Complex
3 Institutional Area
Lodi Road
New Delhi – 110 003
India
Tel. +91 11 436 1051
Fax +91 11 436 0010

Mr Ranjan Das
Representative
Prayas
Amrita Clinic, Athwale Corner
Karve Road Corner
Deccan Gymkhana
Pune – 411 004, India
Tel. +91 20 341230
Fax +91 20 331250
E-mail prayas@vsnl.com

Mr D Dayal
Project Finance Expert
The Cornell Group Inc.
2nd Floor, Jawaharlal Nehru Stadium
New Delhi – 110 003
India
Tel. +91 11 460 4439
Fax +91 11 460 4439

Mr Kaushik Deb
Research Associate
TERI
Darbari Seth Block
Habitat Place
Lodhi Road
New Delhi – 110 003
India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail kdeb@teri.res.in

Mr Makarand Dehejia
President
Industrial Ecology Institute
PO Box 5445
Washington, DC 20016
USA
Tel. +1 22 289 0871
Fax +1 22 371 6531
E-mail emveedee@aol.com

Ms Kirti Devi
Urban Development Specialist
INDO-US Fire Project
E-3/4, Vasant Vihar
New Delhi – 110 057
India
Tel. +91 11 614 9836
Fax +91 11 614 1420

Mr D K Dewan
Superintending Engineer (Commercial)
M P Electricity Board
Govindpura
Bhopal – 462 023, India
Tel. +91 755 586838
Fax +91 755 588828

Mr Khorezad Dordi
Manager (Operations)
Infrastructure Development Finance Co Ltd
Raman House
169, Backbay Reclamation
Mumbai – 400 020
India
Tel. +91 22 283 6255
Fax +91 22 285 0078 or 204 6758

Mr H N Fotedar
Institutional/Privatisation Expert
The Cornell Group Inc.
2nd Floor
Jawaharlal Nehru Stadium
New Delhi – 110 003
India
Tel. +91 11 460 4439
Fax +91 11 460 4439

Mr Ashish Ganda
Research Associate
TERI
Darbari Seth Block
Habitat Place
Lodhi Road
New Delhi – 110 003
India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail ashishg@teri.res.in

Mr G Ganesh
Member/Secretary
Public Sector Disinvestment Communication
Tricourt I
Second Floor
Bhikaji Cama Place
New Delhi – 110 066
India
Tel. +91 11 610 4562
Fax +91 11 610 4566

Dr G D Gautama
Managing Director
West Bengal Power Development Corporation Ltd
New Secretariat Buildings
B Block
6th Floor
1 K S Roy Road
Calcutta – 700 001
India
Tel. +91 33 2483317 or 2430525
Fax +91 33 2488436 or 2103991
E-mail wbpdclm@cal.vsnl.net.in

Ms Manju Ghodke
Assistant Vice President
Economic Research Department
ICICI Ltd
163, Backbay Reclamation
Mumbai – 400 020
India
Tel. +91 22 202 2535
Fax +91 22 204 6582
E-mail kusre@icici.com

Mr S Ghosh
Domestic Coordination
The Cornell Group Inc.
2nd Floor
Jawaharlal Nehru Stadium
New Delhi – 110 003
India
Tel. +91 11 460 4439
Fax +91 11 460 4439

Mr S Ghosh
Managing Director
Consulting Engineering Services (India) Limited
57, Nehru Place
5th Floor
New Delhi – 110 019
India
Tel. +91 11 644 2553
Fax +91 11 646 0409

Mr Robert W Goethe
Port Organisation Expert
The Cornell Group Inc.
2nd Floor
Jawaharlal Nehru Stadium
New Delhi – 110 003
India
Tel. +91 11 460 4439
Fax +91 11 460 4439

Mr Dick Goldman
Director
US Agency for International Development
B-28, Institutional Area
Qutab Hotel Road
New Delhi – 110 016, India
Tel. +91 11 686 5301
Fax +91 11 686 8594
E-mail rgoldman@usaid.gov

Mr S Gopalkrishnan
SLM (DS-Exports)
Indian Oil Corporation Ltd
G-9, Yavar Jung Marg
Bandra East
Mumbai – 400 051
India
Tel. +91 22 642 3272
Fax +91 22 642 7384

Mr P S Govindarajan
Executive Director (Corporate Planning)
Indian Oil Corporation Ltd
Corporate Planning Department
Core-2, SCOPE Complex
7 Institutional Area
Lodi Road
New Delhi – 110 003
India
Tel. +91 11 460 4683
Fax +91 11 460 4683

Mr Amit Gupta
Financial Advisor
Cellular Operators Association of India
F-301, Gauri Sadan
Hailey Road
New Delhi – 110 001
India
Fax +91 11 335 0371

Mr A K Gupta
Chief Engineer (Marketing)
Oil & Natural Gas Corpn Ltd
Tel Bhavan
Dehra Dun – 248 003
India
Tel. +91 135 757121-27
Fax +91 135 755298

Mr B D Gupta
President
JM Financial & Investment Consultancy Services Ltd
11th Floor, 114 Himalaya House
23, K G Marg
New Delhi – 110 001
India
Tel. +91 11 371 5519
Fax +91 11 332 4018

Mr J C Gupta
Special Consultant
National Economic Research Associate Inc.
M 102, Greater Kailash II
New Delhi - 110 048
India
Tel. +91 11 647 4072
Fax +91 11 647 4072

Mr S K Gupta
CPSM
Indian Oil Corporation Limited
G-9, Yavar Jung Marg
Bandra East
Mumbai – 400 051
India
Tel. +91 22 642 3272
Fax +91 22 642 7384

Mr S S Gupta
Deputy Chairman
Paradip Port Trust
Paradip – 754 142
India
Tel. +91 6722 22046
Fax +91 6722 22256

Mr Sanjay Gupta
FPM III Year Student
Indian Institute of Management
Economics & Social Science Area
Bannerghatta Road
Bangalore – 560 076
India
Tel. +91 80 663 2450
Fax +91 80 664 4050

Ms Sangeeta Gupta
Area Convener
TERI
Darbari Seth Block
Habitat Place
Lodhi Road
New Delhi – 110 003
India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail sangeeta@teri.res.in

Mr Subhashish Gupta
Assistant Professor
Economic Research Department
Indian Institute of Management
Economics & Social Science Area
Bannerghatta Road
Bangalore – 560 076
India
Tel. +91 80 663 2450
Fax +91 80 664 4050

Mr Gajendra Haldia
Secretary
Government of Rajasthan
India

Mr Vinod Hari
Manager (Operations)
Infrastructure Development Finance Co. Ltd
Raman House
169, Backbay Reclamation
Mumbai – 400 020
India
Tel. +91 22 283 6255
Fax +91 22 285 0078 or 204 6758
E-mail vinodd@idfc.com

Mr Shaid Hassan
Research Associate
TERI
Darbari Seth Block
Habitat Place, Lodhi Road
New Delhi – 110 003
India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail hasan@teri.res.in

Mr Ira Hireshman
Port Tariff Economist
The Cornell Group Inc.
2nd Floor, Jawaharlal Nehru Stadium
New Delhi – 110 003, India
Tel. +91 11 460 4439
Fax +91 11 460 4439

Mr Aditi Jagtiani
Office Trainee
Infrastructure Development Finance Co Ltd
Raman House
169, Backbay Reclamation
Mumbai – 400 020
India
Tel. +91 22 283 6255
Fax +91 22 285 0078 or 204 6758

Mr B D Jethra
Adviser (I&M)
Planning Commission
Yojana Bhavan
New Delhi – 110 001
India
Tel. +91 11 371 8091
Fax +91 11 371 7681
E-mail room261@yojana.nic.in *or* jetra@yahoo.com

Mr Teruka Jimenez
Financial Analyst
The Cornell Group Inc.
2nd Floor, Jawaharlal Nehru Stadium
New Delhi – 110 003, India
Tel. +91 11 460 4439
Fax +91 11 460 4439

Mr Amit Kapur
Senior Associate
J Sagar Associates
84-E, C6 Lane (Off Central Avenue)
Sainik Farms
New Delhi – 110 062, India
Tel. +91 11 651 8714
Fax +91 11 651 8717

Mr Siddharth Kapur
Vice President (Finance)
Petronet India Limited
ECE House
28 A, K G Marg
New Delhi – 110 001
India
Tel. +91 11 373 8571
Fax +91 11 373 6207 or 331 6894

Mr S K Kaushik
Advisory Board Member
Usha Martin Telekom Limited
69, Sunder Nagar, Ist Floor
New Delhi – 110 003, India
Tel. +91 11 461 8669
Fax +91 11 469 8714

Mr S C Khanna
Secretary General
Association of Basic Telecom Operators
B-601, Gauri Sadan
5 Hailey Road
New Delhi – 110 001, India
Tel. +91 11 335 8585
Fax +91 11 332 7397

Dr Sundeep Khanna
Principal Secretary
Commerce and Industry Department
Govt of Madhya Pradesh
Commerce & Industry Department
Mantralaya, Bhopal
Bhopal – 482 004
India
Tel. +91 755 551836(O) or 555610 (R)
Fax +91 755 559978 or 554912

Mr Rakesh Kohli
Deputy Director (Planning)
Oil Coordination Committee
2nd Floor
Core-8
SCOPE Complex
7, Institutional Area
Lodhi Road
New Delhi – 110 003
India
Tel. +91 11 436 2486

Mr R Krishnamoorthi
General Manager
Power Finance Corporation Limited
Chanderlok, 36 Janpath
New Delhi – 110 001, India
Tel. +91 11 372 2301
Fax +91 11 331 5822

Mr Anurag Kuba
General Manager
Enron India Private Limited
8th Floor
Meridien Commercial Tower
New Delhi – 110 003, India
Tel. +91 11 335 6301–5
Fax +91 11 335 6306–7

Mr Ashwani Kumar
Senior Advocate
LAN Chambers - Ashwani Kumar
C-9, Friends Colony (East)
New Delhi – 110 065, India
Tel. +91 11 684 2758
Fax +91 11 682 0108

Mr M V Kumar
Vice President, IMC Limited
109, G N Chetty Road
T Nagar
Chennai – 600 017, India
Tel. +91 44 823 9831
Fax +91 44 826 0177

Mr Ram Kumar
Caltex Lubricants India Ltd
F-47, South Extension - I
New Delhi, India
Tel. +91 11 464 2314

Mr Sanjay Kumar
Deputy Secretary
Telecom Regulatory Authority of India
16th Floor, Jawahar Vyapar Bhawan
1 Tolstoy Marg
New Delhi – 110 001, India
Tel. +91 11 373 7272
Fax +91 11 331 6780 or 373 8708

Mr Ronald Leasburg
Chief of Party - India Group
International Resources Group
B-20, Mayfair Garden
First Floor, Hauz Khas Enclave
New Delhi – 110 016, India
Tel. +91 11 686 1613–14
Fax +91 11 686 1676

Mr Vinay Mahajan
Former Director General of Mines Safety
A-24, Nizamuddin East
New Delhi – 110 013, India
Tel. +91 11 465 2290
Fax +91 11 462 8667

Mr S D Maheswari
Chief Manager (Finance)
Petroleum Conservation Research Association
100E, New Delhi House
27, Barakhamba Road
New Delhi – 110 001, India
Tel. +91 11 331 9288
Fax +91 11 371 5244

Mr Vishal Malhotra
Manager - Tax
Arthur Andersen
17th Floor, STC Building
Jawahar Vyapar Bhawan
Tolstoy Marg
New Delhi – 110 001, India
Tel. +91 11 375 5000 or 373 9100

Mr S K Malik
Executive Director
Ministry of Railways
Government of India
Railway Board
New Delhi – 110 001, India
Fax +91 11 338 8198

Mr Robert Mansley
Energy and Utilities Group
HSBC Investment Banking
Vintners Place
68 Upper Thames Street
London, UK
Tel. +44 171 336 9512
Fax +44 171 336 9716

Mr Sanjeev Mathur
Head Telecom Business Group
Syscom Corporation
A-298
New Friends Colony
New Delhi – 110 065, India
Tel. +91 11 692 5810
Fax +91 11 692 5402

Mr Vinayak Mavinkurve
Manager (Operations)
Infrastructure Development Finance Co Ltd
Raman House
169, Backbay Reclamation
Mumbai – 400 020, India
Tel. +91 22 283 6255
Fax +91 22 285 0078 or 204 6758

Mr Frederic Mayaki
Project Manager
Power Division
SNC-Lalvalin Inc
1100 Rene-Levesque Blvd.West
Montreal, Quebec, Canada
H3B 4P3 514 391 1000
Tel. +1 514 395 1697

Dr Meera Mehta
Senior Urban Finance Advisor
INDO-US Fire Project
E-3/4, Vasant Vihar
New Delhi – 110 057, India
Tel. +91 11 614 9836
Fax +91 11 614 1420

Mr Piyush Mishra
Deputy Manager (Finance)
Gujarat Infrastructure Development Board
Block No. 18
Udyog Bhavan, Sector 11
Gandhinagar – 382 017, India
Tel. +91 2712 22481 or 32705
Fax +91 2712 22481

Mr S K Misra
Director (C&T)
Ministry of Railways
Government of India
Railway Board
New Delhi – 110 001
Fax +91 11 338 8198

Mr S S Mittal
Indian Oil Corporation Ltd
G-9, Yavar Jung Marg
Bandra East
Mumbai – 400 051, India
Tel. +91 22 642 3272
Fax +91 22 642 7384

Mr A R Mohanty
Member
Orissa Electricity Regulatory Commission
Bidyut Niyamak Bhavan
Unit VIII
Bhubaneswar – 751 012, India
Tel. +91 674 413–08 or 414117
Fax +91 674 419781 or 413306
E-mail orierc@dte.vsnl.net.in

Mr Partha Mukhopadhyay
Asstt. Vice President (Policy Advisory Group)
Infrastructure Development Finance Co Ltd
Raman House
169, Backbay Reclamation
Mumbai – 400 020, India
Tel. +91 22 283 6255
Fax +91 22 285 0078 or 204 6758

Mr P Mukundan
DGM (Finance)
Indian Oil Corporation Ltd
Research & Development Centre
Sector-13, Faridabad
Haryana, India
Tel. +91 129 283702 or 283707
Fax +91 129 286221

Mr Sudhir Muljee
Deputy Chairman
Great Eastern Shipping
15, Rajdhoot Marg
Chanakyapuri
New Delhi – 110 021, India
Tel. +91 11 611 1030

Ms Indrani Nagar
Area Convener
TERI
Darbari Seth Block
Habitat Place, Lodhi Road
New Delhi – 110 003, India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail indrani@teri.res.in

Mr M K Naresh
Govt of Madhya Pradesh
Commerce & Industry Department
Mantralaya, Bhopal
Bhopal – 482 004, India
Tel. +91 755 551836(O) or 555610 (R)
Fax +91 755 559978 or 554912

Mr Raghav Narsalay
Policy Analyst
Consumer Unity & Trust Society
CUTS Centre for International Trade Environment & Economics
D-219 Bhaskar Marg
Bank Park, Jaipur – 302 016
India
Tel. +91 141 20 5802
Fax +91 141 20 2968

Ms Dharitri Panda
Jt. Director (Tariff/Econ.)
Orissa Electricity Regulatory Commission
Bidyut Niyamak Bhavan
Unit VIII
Bhubaneswar – 751 012, India
Tel. +91 674 413–08 or 414117
Fax +91 674 419781 or 413306
E-mail orierc@dte.vsnl.net.in

Mr Manoj Pardasani
Senior Consultant (Tax Division)
Arthur Andersen
17th Floor, STC Building
Jawahar Vyapar Bhawan
Tolstoy Marg
New Delhi – 110 001, India
Tel. +91 11 375 5000 or 373 9100

Mr H Parekh
Dy. General Manager (W.R. I/C)
Indian Oil Corporation Ltd
Morvi Road, Gauridad
Post Box No 1007, Bedipara
Rajkot – 360 003, India
Tel. +91 281 456112
Fax +91 281 456117

Mr A P Parigi
CEO
BPL U S West Cellular Limited
BPL Telecom Centre
No. 54, Richmond Road
Bangalore – 560 025
India
Tel. +91 80 555 9391
Fax +91 80 559 3087

Mr P Niroop Patlolla
Advocate
Supreme Court
6/7, Ist Floor
Sarva Priya Vihar
New Delhi – 110 016
India
Tel. +91 11 652 4337
Fax +91 11 686 2628

Mr R Prabhakar
Manager - Business Plan/Brand Coordinator NR
Bharat Petroleum Corporation Ltd
Bharat Bhawan
4&6, Cumminbhoy Road
Ballard Estate
Mumbai – 400 001, India
Tel. +91 22 261 6281 or 261 8080
Fax +91 22 262 8281

Mr Narayan Prasad
GM (O)
Indian Oil Corporation Limited
Pipelines Division
A-1, Udyog Marg
Noida – 201 301, India
Tel. +91 118 528772
Fax + 91 118 528770

Mr R R N Prasad
Member
Telecom Regulatory Authority of India
16th Floor, Jawahar Vyapar Bhawan
1 Tolstoy Marg
New Delhi – 110 001, India
Tel. +91 11 373 7272
Fax +91 11 373 8708

Mr Saurabh Puri
Manager (Business Development)
Cellular Operators Association of India
F-301, Gauri Sadan
5, Hailey Road
New Delhi – 110 001
India
Tel. +91 11 335 0369
Fax +91 11 335 0371

Mr T Raghavaiah
CH, P&S Manager
Indian Oil Corpn Ltd
G-9, Yavar Jung Marg
Bandra East
Mumbai – 400 054
India
Tel. +91 22 642 3272
Fax +91 22 642 7384

Mr Sridhar Raghavan
Associate Professor
Management Development Institute
PB No. 60
Mehrauli Road
Sukhrali
Gurgaon – 122 001
India
Tel. +91 124 340148 or 340153
Fax +91 124 341180

Mr Ossi Rahkanen
Director
Louis Berger International, Inc.
1819 H Street, N W
Washington, DC 20006
USA
Tel. +1 202 3317775
Fax +1 202 2930787

Mr R P Rajagopalan
Ex. Engineer (Mech)
Chennai Port Trust
Rajaji Salai
Chennai – 600 001
India
Tel. +91 44 562201
Fax +91 44 561228

Mr R Rajamani
General Manager (Tech.)
Mangalore Refinery and Petrochemicals Ltd
Arcadia, 7th Floor
195, NCPA Marg
Nariman Point
Mumbai – 400 021, India
Tel. +91 22 282 2522
Fax +91 22 202 9772

Mr N Raje
General Manager
Indian Oil Corporation Limited
Research & Development Centre
Sector-13, Faridabad
Haryana 121007
India
Tel. +91 129 283702 or 285512
Fax +91 129 286221

Mr M Ramana
Chairman & Managing Director
Indian Oil Corporation Limited
126, Sarojini Devi Road
Secunderabad – 500 003
India
Tel. +91 40 814422
Fax +91 40 848484

Mr M Ramaswamy
Manager (Operations)
Infrastructure Development Finance Co Ltd
Raman House
169, Backbay Reclamation
Mumbai – 400 020, India
Tel. +91 22 283 6255
Fax +91 22 285 0078 or 2046758

Capt. R Ramkumar
Chairman
New Mangalore Port Trust
Panambur
Mangalore – 575 010, India
Tel. +91 824 407300
Fax +91 824 408390

Mr S Ramkumar
Sr Dy Chief Accounts Officer
Chennai Port Trust
Rajaji Salai
Chennai – 600 001
India
Tel. +91 44 560164
Fax +91 44 561228

Mr V Ranganathan
Professor
Institute of Management
Bannerghatta Road
Bangalore – 560 076, India
Tel. +91 80 663 2450
Fax +91 80 664 4050

Mr A M Rao
Managing Director
IMC Limited
109, G N Chetty Road
T Nagar
Chennai – 600 017, India
Tel. +91 44 826 5434
Fax +91 44 826 0177

Mr D J Balaji Rao
Managing Director
Infrastructure Development
Finance Co Ltd
Raman House
169, Backbay Reclamation
Mumbai – 400 020, India
Tel. +91 22 283 6255
Fax +91 22 285 0078 or 204
6758

Mr J Rajeswar Rao
Dy Director General
Department of Telecom
1004, Sanchar Bhawan
20, Akbar Road
New Delhi – 110 001, India
Tel. +91 11 371 6608

Mr N Jayavanth Rao
Resident Commercial Director
ALSTOM India
W-123, Greater Kailash I
New Delhi – 110 048, India
Tel. +91 11 644 9849
Fax +91 11 646 3404

Mr K V Rao
Joint Secretary (Ports)
Ministry of Surface Transport
(Ports Wing)
Government of India
Parivahan Bhavan
1 Sansad Marg
New Delhi – 110 001

Mr S S Rao
Superintending Engineer
(Commercial)
Andhra Pradesh Electricity
Board
Vidyut Soudha
Hyderabad – 500 049
India
Tel. +91 40 339 6000

Mr Sadashiv S Rao
Vice President (Operations)
Infrastructure Development
Finance Co Ltd
Raman House
169, Backbay Reclamation
Mumbai - 400 020
India
Tel. +91 22 283 6255
Fax +91 22 285 0078 or
204 6758

Mr N Ravi Shanker
Secretary, Home Department
Government of Uttar Pradesh
Lucknow
India

Mr A Ravindran
Ex. Engineer (Traffic)
Chennai Port Trust
Rajaji Salai
Chennai – 600 001
India
Tel. +91 44 562201
Fax +91 44 561228

Mr Anil Razdan
Joint Secretary
Ministry of Power
Government of India
Shram Shakti Bhawan
New Delhi – 110 001

Mr Pradip Roy
General Manager
Industrial Development Bank
of India
IDBI Tower, Cuff Parade
Mumbai – 400 005, India
Tel. +91 22 218 9111
Fax +91 22 218 1294

Mr U K Roy
Sr Technical Manager -
Refineries
Indian Oil Corporation Ltd
Refineries Division
SCOPE Complex, Core-2
7, Institutional Area, Lodi Road
New Delhi – 110 003, India
Tel. +91 11 436 1398
Fax +91 11 436 1398

Mr Vikram Roy
European Union
65, Golf Links
New Delhi – 110 003, India
Tel. +91 11 462 9237
Fax +91 11 462 9206

Mr R B Sahi
General Manager
Bharat Petroleum Corporation Ltd
A-5 & 6, Sector 1
Noida – 201 301, India
Tel. +91 118 539155
Fax +91 118 553462 or 532410

Mr Harvey Salgo
Vice President
La Capra Associates
330, Washington Street
Suite 855, Boston, USA
Tel. +1 617 951 0525
Fax +1 617 951 0528

Mr G S Samuel
Managing Director
Consulting Engineering
Services (India) Limited
57, Nehru Place, 5th Floor
New Delhi – 110 019, India
Tel. +91 11 643 1915
Fax +91 11 646 0409

Mr Sridhar Samurdrala
Senior Program Coordinator
US Energy Association
1620, Eye Street, NW
Suite 1000
Washington, DC 20006, USA
Tel. +1 202 331 0415
Fax +1 202 659 0418

Mr P K Sarkar
Manager (F&A)
Oil & Natural Gas Corpn Ltd
Tel Bhavan
Dehra Dun – 248 003, India
Tel. +91 135 757121–27
Fax +91 135 755298

Mr P K Sasikumar
Asstt Executive Engineer
Cochin Port Trust
Willingdon Island
Kochi – 682 009, India
Tel. +91 484 666871
Fax +91 484 668163

Mr V Satyanarayana
Infrastructure Finance Advisor
INDO-US Fire Project
E-3/4, Vasant Vihar
New Delhi – 110 057
India
Tel. +91 11 614 9836
Fax +91 11 614 1420

Mr V S Saxena
General Manager
Power Finance Corporation Ltd
Chanderlok
36 Janpath
New Delhi – 110 001, India
Tel. +91 11 372 2301
Fax +91 11 331 5822

Ms Joanna Schrock
National Economic Research Associates Inc.
1255 23rd Street NW
Washington, DC 20037, USA
Tel. +1 202 466 9231
Fax +1 202 46 9253

Mr V K Sehgal
Consultant
19, North Avenue Road
Punjabi Bagh (W)
New Delhi – 110 026, India
Tel. +91 11 510 4074 or 545 1307
Fax +91 11 515 0701

Mr A Selvaraj
Consultant
J Sagar Associates
84-E, C6 Lane (Off Central Avenue)
Sainik Farms
New Delhi – 110 062, India
Tel. +91 11 651 8714
Fax +91 11 651 8717

Mr Ardhendu Sen
Visiting Fellow
TERI, Darbari Seth Block
Habitat Place, Lodhi Road
New Delhi – 110 003, India
Tel. +91 11 462 2246 or 460 1550
Fax +91 11 462 1770 or 463 2609
E-mail asen@teri.res.in

Mr B Sen
Director, Ministry of Commerce
Government of India
North Block
New Delhi – 110 001

Ms Supriya Sen
The World Bank, 70, Lodhi Estate
New Delhi – 110 003, India
Tel. +91 11 461 7241
Fax +91 11 462 8073

Mr Anoop Sharma
Sr Manager - Electricity Sector
HSBC Investment Banking
HSBC Capital Markets India Pvt Ltd
Ashoka Estate (3rd Floor)
24, Barakhamba Road
New Delhi – 110 001, India
Tel. +91 11 373 1234
Fax +91 11 373 7691

Mr Deepak Sharma
Regional Manager
Credit Analysis and Research Limited
504, Indraprakash Building
21, Barakhamba Road
New Delhi – 110 001
India
Tel. +91 11 371 6199
Fax +91 11 371 8701

Mr Deepak Sharma
Research Associate
TERI
Darbari Seth Block
Habitat Place
Lodhi Road
New Delhi – 110 003
India
Tel. +91 11 462 2246 or 462 1550
Fax +91 11 462 1770 or 463 2609
E-mail dsharma@teri.res.in

Mr Y P Sharma
XEN/Tariff
Haryana Vidyut Prasarn Nigam Ltd
Panchkula, Haryana
India

Mr Raman Sidhu
Director - Investment Banking
HSBC Investment Banking
HSBC Capital Markets India Pvt Ltd
Ashoka Estate (3rd Floor)
24, Barakhamba Road
New Delhi – 110 001
India
Tel. +91 11 373 1234
Fax +91 11 373 7691

Mr T P Singh
Director
Central Electricity Authority
Ministry of Power
Sewa Bhawan, R K Puram
New Delhi – 110 066, India
Tel. +91 11 610 8751
Fax +91 11 619 7267

Mr Arun Sinha
Member
Telecom Regulatory Authority of India
16th Floor, Jawahar Vyapar Bhawan
1 Tolstoy Marg
New Delhi – 110 001
India
Tel. +91 11 373 7272
Fax +91 11 373 8708

Mr K P Sinha
Vice President (Gas Division)
Gujarat Gas Company Limited
2, Sharusadan Society
Near Parimal Garden
Ellisbridge
Ahmedabad – 380 006
India
Tel. +91 79 642 6980
Fax +91 79 642 6249

Mr Rajesh Sinha
Financial Analyst, Energy Section
The World Bank
70, Lodhi Estate
New Delhi – 110 003
India
Tel. +91 11 461 7241
Fax +91 11 461 9393

Prof. Sidharth Sinha
Indian Institute of Management
Ahmedabad – 380 015
India
Tel. +91 79 640 7241
Fax +91 79 642 7896

Rear Admiral K R Srinivasan
Chief Hydrographer
Government of India
Naval Headquarters
Room No 222, D Wing
Sena Bhavan
New Delhi – 110 011
India
Tel. +91 11 301 1900
Fax +91 11 301 7684

Mr Anupam Srivastava
Vice President (Operations)
Infrastructure Development Finance Co Ltd
Raman House
169, Backbay Reclamation
Mumbai – 400 020
India
Tel. +91 22 282 0282
Fax +91 22 285 0078

Mr B Suresh
Executive Director
Credit Analysis and Research Limited
Temple Tower
Ist Floor, 476 Anna Salai
Chennai – 600 035, India
Tel. +91 44 433 1051
Fax +91 44 434 2708

Mr S Swaminathan
Executive
JM Financial & Investment Consultancy Services Ltd
11th Floor, Himalaya House
23, K G Marg
New Delhi – 110 001, India
Tel. +91 11 371 5519
Fax +91 11 332 4018

Mr Sri Kumar Tadimalla
Manager (Policy Advisory Group)
Infrastructure Development Finance Co Ltd
Raman House
169, Backbay Reclamation
Mumbai – 400 020
India
Tel. +91 22 283 6255
Fax +91 22 285 0078 or 204 6758

Mr V Tandon
Finance Expert
The Cornell Group Inc.
2nd Floor, Jawaharlal Nehru Stadium
New Delhi – 110 003, India
Tel. +91 11 460 4439
Fax +91 11 460 4439

Mr P D Tawakley
Adviser
Caltex Lubricants India Ltd
F-47, South Extension - I
New Delhi, India
Tel. +91 11 464 2314

Mr Vastal Thakor
Advisory Board Member
Infrastructure Development Finance Co Ltd
Raman House
169, Backbay Reclamation
Mumbai – 400 020, India
Tel. +91 22 283 6255
Fax +91 22 285 0078 or 204 6758

Mr C Unnikrishnan
Deputy Secretary
Cochin Port Trust, Willingdon Island, Kochi – 682 009, India
Tel. +91 484 666871
Fax +91 484 668163

Mr Gajendra Upadhyay
General Manager (Operations)
Association of Basic Telecom Operators
B-601, Gauri Sadan, 5 Hailey Road
New Delhi – 110 001, India
Tel. +91 11 335 8585
Fax +91 11 332 7397

Mr N L Vaidyanathan
Legal/Port Regulation/Public Law
The Cornell Group Inc.
2nd Floor, Jawaharlal Nehru Stadium
New Delhi – 110 003, India
Tel. +91 11 460 4439
Fax +91 11 460 4439

Mr N N Vaishnav
General Manager (NBD/LNG Group)
Gujarat Gas Co Ltd
2, Sharusadan Society
Near Parimal Garden, Ellisbridge
Ahmedabad – 380 006, India
Tel. +91 79 642 6980
Fax +91 79 642 6249

Ms Elizabeth Ward
First Secretary
Australian High Commission
No. 1/50, Shantipath
Chanakyapuri
New Delhi – 110 021
India
Tel. +91 11 688 8223
Fax +91 11 688 7366

Mr John Williams
Director
Infrastructure and Privatization Studies
SNC.Lavalin
1000 Rene-Levesque Blvd.West
Montreal, Quebec
Canada H3B 4P3
Tel. +1 534 3931000

Mr Thomas Zachariah
Chief Manager (Corporate Planning)
Cochin Refineries Limited
Post Bag No 2, Ambalamugal
Ernakulam – 682 302
India
Tel. +91 484 780261
Fax +91 484 75855